PATHWAY ANALYSIS REPORT

STANDARD CHLORINE CHEMICAL CO. INC. SITE
KEARNY, NEW JERSEY

Prepared for:

Performing Parties Group
(Beazer East, Inc., Cooper Industries, LLC, Tierra Solutions, Inc., on behalf of Occidental Chemical Corporation and Apogent Transition Corporation)

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ABBREVIATIONS/ACRONYMNS

ABS	Dermal Absorption Fraction
ACO	Administrative Consent Order
ADD	Average Daily Dose
Agreement	Administrative Settlement Agreement and Order on Consent
Apogent	Apogent Transition Corporation
Beazer	Beazer East, Inc.
BHHRA	Baseline Human Health Risk Assessment
Cooper	Cooper Industries, LLC
COPC	Chemical of Potential Concern
CSF	Cancer Slope Factor
CSM	Conceptual Site Model
CTE	Central Tendency Exposure
DNAPL	Dense Non-Aqueous Phase Liquid
EE/CA	Engineering Evaluation/Cost Analysis
EPC	Exposure Point Concentration
FFS	Focused Feasibility Study
HCTS	Hydraulic Control Treatment System
IRA	Interim Response Action
IRAW	Interim Response Action Workplan
IRM	Interim Remedial Measure
IUR	Inhalation Unit Risk
KEY	Key Environmental, Inc.
LADD	Lifetime Average Daily Dose
LOAEL	Lowest Observed Adverse Effect Level
MESA	Memorandum on Exposure Scenarios and Assumptions
mg/kg	milligrams per kilogram
NJDEP	New Jersey Department of Environmental Protection
NJPDES	New Jersey Pollutant Discharge Elimination System
NOAEL	No Observed Adverse Effect Level
NPL	National Priorities List
OCC	Occidental Chemical Corporation
PAH	Polycyclic Aromatic Hydrocarbon
PAR	Pathway Analysis Report
PCBs	Polychlorinated biphenyls
PCDD/PCDF	Polychlorinated dibenzodioxin/Polychlorinated dibenzofuran
RA	Removal Action
RfC	Reference Concentration
RfD	Reference Dose
RI	Remedial Investigation
RME	Reasonable Maximum Exposure
RSL	Regional Screening Level

SCCC	Standard Chlorine Chemical Co., Inc.
Site	Standard Chlorine Chemical Co., Inc. Site
SOW	Statement of Work
USEPA	United States Environmental Protection Agency

1.0 INTRODUCTION

This Pathway Analysis Report (PAR) for the Standard Chlorine Chemical Co. Inc. (SCCC) Site (Site) located in Kearny, New Jersey was prepared by Key Environmental, Inc., (KEY) on behalf of the Performing Parties Group (Group). The Group consists of Beazer East, Inc. (Beazer), Cooper Industries, LLC (Cooper), Tierra Solutions, Inc. (Tierra) on behalf of Occidental Chemical Corporation (OCC), and Apogent Transition Corporation (Apogent). This PAR has been prepared to address the preliminary planning requirements for the Baseline Human Health Risk Assessment (BHHRA), to be prepared in conjunction with the Site Remedial Investigation. This work is being conducted pursuant to the Statement of Work (SOW) issued by the United States Environmental Protection Agency (USEPA) as Appendix A of the Administrative Settlement Agreement and Order on Consent dated May 3, 2013 (Agreement). The SOW also required that a Memorandum on Exposure Scenarios and Assumptions (MESA) be prepared. In accordance with the approved Final Remedial Investigation/Focused Feasibility Study Work Plan (RI/FFS Work Plan; KEY, September 2013), the Group has incorporated the information required for the MESA into this PAR such that a single document addresses all SOW requirements for the PAR and MESA.

The purpose of this document is to allow all stakeholders the opportunity to review and comment on the approach to the exposure assessment before potential risks are estimated.

1.1 OVERVIEW OF THE PAR

In order to prepare this PAR and define current exposure scenarios, KEY considered both current and reasonably foreseeable future use(s) of the Site, remedial measures completed, and ongoing and established restrictions in land use. Hypothetical future exposures were identified to be consistent with planned remedial measures, land use restrictions and reasonably expected future use of the Site for non-residential purposes.

Information typically presented in a MESA has been integrated into the PAR; in accordance with the RI/FFS Work Plan approved by the USEPA on September 27, 2013. The PAR addresses the exposure setting and receptor characteristics for the Site. It identifies current and reasonably foreseeable future land use and exposure pathways by which potential receptors, as population groups, not individuals, may be exposed in the absence of added remedial measures or land use restrictions. Exposure pathways were identified based on consideration of the sources and locations of contaminants, existing remedial measures and ongoing controls, the likely environmental fate of the contaminants, and the location and activities of the potentially exposed populations. The PAR identifies potential exposure points and routes of exposure for each exposure pathway, as well as specific parameters that define the characteristics of the receptor groups. The PAR also identifies specific chemicals of concern for each exposure medium/scenario combination and presents the results of statistical analysis of the analytical results to define potential exposure point concentrations. Finally, this document presents the toxicity information that will be used in the BHHRA to quantify human health risks to the various chemicals of concern in environmental media. In summary, this document presents all information required in Tables 1 through 6 of Part D: Standardized Planning, Reporting and Review of the USEPA's current risk assessment guidance (USEPA, December 2001a).

The PAR was developed in accordance with USEPA guidance set forth in the following documents:

- *Risk Assessment Guidance for Superfund: Volume I: Human Health Evaluation Manual, Part A* (USEPA, December 1989)
- *Risk Assessment Guidance for Superfund: Volume III-Part A, Process for Conducting Probabilistic Risk Assessment* (USEPA, December 2001b)
- *Risk Assessment Guidance for Superfund: Volume I: Human Health Evaluation Manual, Part D, Standardized Planning, Reporting and Review of Superfund Risk Assessments* (USEPA, December 2001a)
- *Risk Assessment Guidance for Superfund: Volume I: Human Health Evaluation Manual, Part E, Supplemental Guidance for Dermal Risk Assessment* (USEPA, July 2004)
- *Risk Assessment Guidance for Superfund: Volume I: Human Health Evaluation Manual, Part F, Supplemental Guidance for Inhalation Risk Assessment* (USEPA, January 2009)
- *Exposure Factors Handbook: 2011 Edition* (USEPA, September 2011)
- *Exposure Factors Handbook: Volumes I, II, and III* (USEPA, August 1997)
- *Child-Specific Exposure Factors Handbook* (USEPA, September 2008)
- *Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites* (USEPA, December 2002)
- *Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway for Groundwater and Soils* (USEPA, November 2002)

This PAR consists of seven sections, as follows:

- Section 1 – Introduction
- Section 2 – Site Background and Setting
- Section 3 – Conceptual Site Model
- Section 4 – Selection of Chemicals of Potential Concern
- Section 5 – Exposure Assessment
- Section 6 – Toxicity Assessment
- Section 7 – References

2.0 SITE BACKGROUND AND SETTING

The SCCC Site is located at 1025-1035 Belleville Turnpike in Kearny, New Jersey. Figure 1 is a Site location map which shows the existing Site boundaries on a base map which consists of combined portions of two United States Geologic Survey 7.5 minute quadrangles (Jersey City and Weehawken, New Jersey). The Site is situated adjacent to the Hackensack River in Hudson County, New Jersey, and is located approximately 4,000 feet east of the intersection of I-95 and I-280. The Site is bounded to northeast by the Hackensack River, to the south by the adjacent Seaboard Site, to the north by the adjacent Diamond Site, and to the west by the Belleville Turnpike. Substantial remedial measures have been implemented at the Site as discussed in detail in Section 2.2. A recent aerial photograph depicting current Site conditions is provided as Figure 2.

The Site, as the description is used in this PAR, refers to the definition of the "Site" in the Agreement and the RI/FFS SOW, but is limited to the former SCCC upland properties, excluding the riparian parcel (known as Lot 52R or 52.01). The riparian parcel is excluded for several reasons, as follows: 1) stormwater sampling and analysis has shown no loading to the river via runoff or groundwater intrusion in the storm sewer; 2) the groundwater is fully contained within the barrier wall system and does not discharge to the river; 3) near-shore river sediments were removed and restoration was completed; and 4) given the existence of multiple other point and area sources in the watershed, the USEPA has determined that the Hackensack River is more appropriately assessed under a broader program. In addition, while past remedial response actions on the SCCC Site have been integrated with areas of contiguous impact on the adjacent Diamond and Seaboard sites, those sites are adequately regulated under the State of New Jersey, Department of Environmental Protection (NJDEP) requirements and are excluded from consideration in the PAR. The one exception is consideration of potential exposure pathways associated with SCCC Site impacts that have not been addressed through existing remedial actions (e.g., consideration of DNAPL in soil and groundwater impacts located beyond the influence of barrier wall/containment system).

2.1 SITE DESCRIPTION

The Site occupies an area of approximately 25 acres, consisting of five upland parcels referred to on the Tax Map of the Town of Kearny as Block 287, Lots 48, 49, 50, 51, and 52. These lots currently are owned by the Town of Kearny. The Site includes another parcel, Lot 32.01, which is a former railroad right-of-way currently owned by the Hudson County Improvement Authority. Figure 3 identifies the lot numbers for the various Site parcels. The Site is located along the tidal portion of the Hackensack River.

The Site is located in a former meadow that was filled in at the beginning of the 20^{th} century. Significant areas of meadowlands remain north and west of the Site. The filling occurred to support industrial development of the Site and surrounding properties.

Hudson County lies within the Piedmont Province of New Jersey. It is mainly underlain by slightly folded and faulted sedimentary rocks of Triassic and Jurassic age (240 to 140 million years old) and igneous rocks of Jurassic age. Geology at the Site consists of upper fill materials ranging in thickness from 2 to 10 feet, an underlying peat layer locally referred to as the Meadow Mat, a deeper sand unit approximately 10 feet thick, and below these units, a massive low permeability varved clay unit acting as an aquitard. The varved clay is continuous beneath the areal extent of the Site, is at least 40 feet thick, and is underlain by glacial till and bedrock.

2.2 SITE HISTORY

Since 1916, various forms of chemical manufacturing, blending/mixing and/or processing have occurred on the different parcels that make up the Site. Activities included naphthalene refining and product formulation, dye-carrier production, dichlorobenzene refining and product formulation, and lead-acid battery manufacture. Additionally, it has been reported that the former Site owners and/or operators placed fill materials containing chromite ore processing residue (allegedly from the adjacent Diamond Site), lead mud oxide, and other fill materials on the Site. These activities were performed by multiple corporations on different parcels of the Site.

In October 1989, the New Jersey Department of Environmental Protection (NJDEP) and SCCC entered into an Administrative Consent Order (ACO). This ACO required SCCC to plan and implement the following:

- Interim Remedial Measures (IRMs) to prevent potential contact with materials in the lagoon area and to secure damaged tanks and containers
- A Remedial Investigation and Feasibility Study
- Selected Remedial Alternative(s)

Subsequent to the ACO, a remedial investigation was conducted in a phased approach between 1990 and 1999. In addition, various IRMs were completed, as described in Section 2.2.1.

In December 2001, NJDEP referred the Site to USEPA for proposed inclusion on the National Priorities List (NPL). On April 30, 2003, the USEPA proposed to add the Site to the NPL and the Site was subsequently listed on September 19, 2007. Work under the SCCC ACO continued through the period of Site Listing, and included the development of an NJDEP-approved Interim Response Action Workplan (IRAW). Upon Site listing, an Engineering Evaluation/Cost Analysis (EE/CA) corresponding to the response proposed in the NJDEP-approved IRAW was submitted to (and approved by) the USEPA. The USEPA designated NJDEP as the lead agency for implementation of the Interim Response Action (IRA) as described in the IRAW and EE/CA, but the USEPA remains the lead agency for all other response activities undertaken at the Site.

Over the last twenty-five to thirty years numerous investigative and interim response activities have been undertaken at the Site. Most of these activities were completed on behalf of or by SCCC, the Peninsula Restoration Group (PRG) (a group that consisted of Beazer, Tierra on behalf of OCC, and SCCC), and most recently, by the Group. While the PRG and NJDEP were in the process of negotiating a scope of work for an IRA, activities such as multiple work plan submittals, an asbestos and lead paint survey, wetlands delineation, an aerial topographic survey, waste classification requests, off-site disposal of demolition debris, numerical groundwater model development, subsurface vault content sampling and analysis, and a request to use the USEPA's Area of Contamination Policy were completed proactively by the PRG. Environmental investigations, dating back to the early 1980s, have also been completed for the Site, as follows:

1983-1984	Hydrogeologic Investigation	Roy F. Weston, Inc.
1985	Phase II Dioxin Investigation	E.C. Jordan, Inc.
1987	Stage 1 Dioxin Investigation	Roy F. Weston, Inc.
1988	Stage 2 and 3 Dioxin Investigations	Roy F. Weston, Inc.
1991	Chromium Delineation	French & Parrello Associates
1990-1993	Remedial Investigation/Supplemental RI	Roy F. Weston, Inc.
1996-1997	Focused Remedial Investigation	ERM, Inc.
1997-1999	Supplemental Remedial Investigation	Key Environmental, Inc.
2000	Soil/Sediment Sampling and Analysis	Enviro-Sciences, Inc.
2000	Characterization of Containerized Materials	Enviro-Sciences, Inc.
2002	Surface Water and Sediment Sampling	USEPA TAT
2008-2009	IRA Pre-Design Investigation	Key Environmental, Inc.
2008-2009	Phase II Supplemental RI	Key Environmental, Inc.

From 2002 through 2008, various project planning activities were undertaken with respect to pre-design, remedial investigation and interim response activities. Multiple response actions have been undertaken at the Site, consisting of IRMs, an IRA, a Removal Action, and other miscellaneous responses. Brief descriptions of these responses are as follows:

2.2.1 Interim Remedial Measures (IRMs)

Various IRMs have been implemented at the Site dating back to the early 1990s. These IRMs have been completed to preclude potential risks associated with exposure to chromium-impacted soils, to preclude access to impacted soils and the lagoon in the former process area, to control fugitive dust emissions, to provide protection of the lagoon area from flooding, and to control potential constituent migration via existing storm sewers. IRM activities were as follows:

- Installation of security fencing surrounding a former production area and lagoons to prevent unauthorized access (early 1990s) - Lots 49 and 52;
- Addition of soil to the lagoon berm to increase its height and freeboard to prevent potential overflows (early 1990s) - Lot 52;
- Placement of stabilizing geotextile and rip rap along the Hackensack River shoreline in the vicinity of the lagoons (early 1990s) - Lot 52;
- Removal of the contents of five above-ground storage tanks and repackaging of asbestos-containing material removed from the former distillation building (early 1990s) - Lot 49;
- Installation of an asphalt pavement overlay on traffic areas where existing deteriorated asphalt pavement was present (1991) - Lots 48, 49, and 51;

- Installation of geotextile fabric/aggregate/asphalt cover in all remaining traffic areas where total chromium concentrations exceeded the NJDEP standard in effect at the time, 75 milligrams per kilogram (mg/kg) (1991) - Lots 49 and 52;
- Geotextile/geomembrane liner/aggregate cover construction in non-traffic areas west of a railroad right-of-way (1991) - Lot 51;
- Installation of a dust fence barrier along the railroad right-of-way and north fence line of the former northeast process area (1991) - Lots 49 and 52; and,
- Improvements to existing stormwater sewer located between the Site and the adjacent Diamond Site to the north (2008) - Lots 48 and 49.

Site conditions upon completion of the IRMs (2008) are presented in Figure 3.

2.2.2 Interim Response Action (IRA)

An IRA was completed in 2010 and 2011 and included significant construction components which have resulted in containment, control, and treatment of impacted media at the Site. The IRA was designed to address environmental conditions at both the Site and at the adjacent Diamond Site. The IRA was completed to eliminate the potential for subsurface discharge of constituents to the Hackensack River from the Site, to eliminate the potential for overland runoff of constituents to the Hackensack River from the Site, to remove Dense Non-Aqueous Phase Liquid (DNAPL) to the extent practicable as a source control measure, and to eliminate the potential for direct contact with constituents of interest at the Site. The IRA consisted of the following major components:

- Site preparation activities
- Physical barrier wall system installation
- Hydraulic Control and Treatment System (HCTS) construction
- DNAPL recovery system installation
- Lagoon dewatering, backfilling, and surface cover installation
- Near-shore sediment management (excavation and disposal)
- South Ditch sediment management and stormwater management system construction
- Consolidation Area construction
- Wetland and shoreline mitigation
- Septic tank closure
- Transformer pad removal and remediation
- Site restoration
- Air monitoring activities

Implementation of the IRA was such that the Site and the adjacent Diamond Site are now fully enclosed by a slurry wall keyed into the varved clay unit, is further separated from the Hackensack River by a steel sheet pile wall, is partially capped to prevent direct contact and overland runoff, has a new and upgraded infiltration-resistant stormwater management system, and has had multiple potential sources and impacted media removed or managed (i.e., polychlorinated biphenyls (PCB) impacted soil from the transformer area, wastewater treatment lagoons, septic tanks, ditch sediments, and near-shore river sediments).

Reduction of toxicity, mobility, and volume has been achieved to date and is ongoing via the operation of groundwater and DNAPL recovery wells and an effective, permitted groundwater treatment plant. The HCTS has unit operations consisting of chromium reduction, metals precipitation, carbon adsorption, oil separation, and solids management and is operating in compliance with effluent limits established under New Jersey Pollutant Discharge Elimination System Permit No. NJG0175102.

2.2.3 Removal Action

A Removal Action (RA) was completed at the Site in 2010 which consisted of sealing existing structures on Lot 49 that were perceived to be potential sources of wind-borne particulates. The RA was completed pursuant to an Administrative Settlement Agreement and Order on Consent for Removal Action entered into between the USEPA, SCCC, and Beazer dated June 7, 2010. An Administrative Order Notice of Completion was issued by the USEPA on January 20, 2011. The buildings that were sealed have since been demolished and removed from the Site.

2.2.4 Additional Response Actions

Several additional response actions have been completed at the Site and consisted of demolition of the majority of the Site structures and disposal of historical containerized materials associated with past abatement operations and Site investigations. Demolition of all structures except historical structures associated with former activities of Thomas A. Edison, Inc. at the Site (Buildings 1, 2, 3 and 4) has been completed. The demolition of the structures on Lots 48 and 49 was completed in three separate phases designated as Track 1, Track 2, and Track 3. Track 1 demolition was completed prior to IRA implementation to facilitate IRA construction activities. Track 2 and Track 3 building demolition was conducted as the IRA neared completion. NJDEP-approved work plans, which were also provided to USEPA for review, were prepared for each phase of the demolition work. Upon completion, each phase of demolition was summarized in a Demolition Remedial Action Report that was submitted to the NJDEP.

Various asbestos-abatement materials and investigation-derived waste had been previously containerized and stored at the Site in six SeaLand containers. These materials were appropriately characterized and managed on-site. A total of seven material shipments were made to an off-site disposal facility (Chemtron Corporation in Avon, Ohio). Current conditions on the Site, the adjacent Diamond Site and the northern portion of the Seaboard Site following IRA construction are shown in Figure 4.

2.3 LAND AND WATER USE

Land use in the general vicinity of the Site is limited to industrial and commercial use, and/or easements for transportation corridors. There are no nearby residential areas. The nearest residential area is in Jersey City, located more than one mile southeast of the Site and on opposite side of the Hackensack River. Residential land uses are not permitted as per the recently adopted redevelopment plan.

North of the Site is former industrial property once operated by Diamond Shamrock and known as the Diamond Site, which is currently not in use, but contains two vacant structures. South of the Site is another former industrial property known as the Seaboard Site, which is currently used for the placement and spreading of process dredge material (PDM). East of the Site is the Hackensack River. West of the Site is Belleville Turnpike and various outlying industrial properties.

Currently, the Site contains a few abandoned historic building structures, multiple foundations from buildings that were demolished during past response actions, and the HCTS building. A Redevelopment Plan (New Jersey Meadowlands Commission, February 2013) has designated the Site and surrounding properties (a total of 74 properties on 367 acres) for redevelopment, with the goal of capitalizing on existing road, rail and marine transportation prospects in the area. In this plan, the Site was designated for Intermodal B land uses. Intermodal facilities are typically those where cargo is transferred from one mode of transportation to another. Recommended uses for the area consist of the following categories: 1) Industrial/storage/trucking uses; 2) Transport support services; 3) Neighborhood services (e.g., truck stops or retail to support working people); 4) Public or quasi/public uses (e.g., utilities); or 5) Water-dependent uses (boat sales and repair or port facilities). The goal is to return these properties to productive industrial or commercial uses. In addition, it should be noted that a groundwater classification exception area /well restriction area is in place for the Site and adjacent Sites.

The Site is located in a former meadow that was filled in at the beginning of the 20th century. The Hackensack River forming the eastern Site boundary is tidally influenced. The entire Site lies within the 100-year floodplain of the Hackensack River (EDR, May 5, 2008).

Historically, surface water runoff in portions of the Site was channeled into surface ditches and wetland areas that originated on the Site and flowed to the south into what was referred to as the South Ditch On Lots 50, 51 and 52. Surface water runoff eventually discharged into the Hackensack River. In addition, an underground storm sewer with catchment basins located along the northern Site boundary between Lots 48 and 49 and the Diamond Site and was replaced in 2008 prior to the IRA. As a major component of the IRA, a new infiltration-resistant storm water collection system was installed to manage the runoff previous discharged via the South Ditch. This system consists of underground high-density polyethylene conveyance pipes and a series of drop inlets. Since the vast majority of the former process areas, fill placement areas, and wastewater management units (lagoons) are solidified and capped or lie within the limits of the capped Consolidation Area, erosion of surface soil is no longer occurring and no flowing surface water or groundwater are present at the Site. Groundwater that collects within the slurry wall is pumped, treated and discharged under an NJPDES permit.

The Hackensack River adjacent to the Site is classified as SE2. This classification applies to saline estuarine water with the following designated uses:

- Maintenance, migration and propagation of the natural and established biota
- Migration of diadromous fish
- Maintenance of wildlife
- Secondary contact recreation
- Any other reasonable uses.

The Hackensack River in the Site vicinity is tidally influenced. A tidal range of approximately 5 to 6 feet occurs in this lower portion of the river. The Passaic River is approximately one mile west of the Site and discharges to Newark Bay which is located downstream of the Site, but no hydraulic connection exists between groundwater in the fill or sand unit aquifers at the Site and the Passaic River, or between the Site and the Hackensack River since the installation of the barrier wall in 2011. Furthermore, prior to the installation of the barrier wall, groundwater flow was toward the South. There are no known groundwater wells used as a source of private or public drinking water within one mile of the Site (KEY, May 2011). No drinking water intakes are located in the Hackensack River in this tidal reach due to the water being brackish. The Town of Kearny water is supplied by the Wanaque Reservoir in Bergen County, New Jersey.

2.4 CURRENT SITE OPERATION, MAINTENANCE AND MONITORING (OM&M)

The current Site OM&M activities consist of the following tasks:

- Visual inspection of the freshwater wetland mitigation areas
- Visual inspection of the various surface covers
- Visual inspection of the stormwater system
- Visual inspection of the barrier wall system and cathodic protection system
- Visual inspection of the consolidation area surface cover
- Visual inspection of drainage channels
- Visual inspection of Site security (fences)
- DNAPL recovery
- Operation of the hydraulic control groundwater extraction and treatment systems
- Waste management (i.e., spent carbon regeneration; DNAPL and filter cake characterization and off-site disposal)
- Measurement of potentiometric surface elevations and apparent DNAPL thicknesses
- Maintenance of the paved and vegetative surface covers
- Periodic maintenance of IRA and IRM components such as cathodic protection system
- Recordkeeping and regulatory reporting of the monitoring and maintenance activities

Operation and maintenance of the HCTS, as well as water discharge and air monitoring is a primary component of OM&M activities for the Site. Certified personnel operate the HCTS in accordance with the requirements of an NJDEP New Jersey Pollutant Discharge Elimination System (NJPDES)/Discharge to Surface Water permit (Permit Number NJG0175102). The permit authorizes the off-site discharge of treated groundwater and lists the associated requirements such as effluent limits, influent and effluent monitoring, monthly and annual reporting, and recordkeeping.

The Site's shallow groundwater table within the barrier wall system is regulated by the hydraulic control wells connected to the HCTS. Monthly gauging of piezometers located inboard and outboard of the slurry wall barrier wall system is conducted to evaluate the performance of the hydraulic control system. In addition, routine inspection and maintenance of various Site improvements, IRM and IRA features is completed as listed above. Operation and maintenance associated with these features is accomplished via the use of checklists and corrective action is initiated as required.

3.0 CONCEPTUAL SITE MODEL

A preliminary Conceptual Site Model (CSM) originally developed for the Site Characterization Summary Report (KEY, March 2013) was refined based on additional site sampling performed as part of the RI/FFS in late 2013. This CSM is based on consideration of Site modifications resulting from implementation of the IRAs, including but not necessarily limited to, the existence of the fully-enclosing perimeter subsurface barrier wall system, the operation of the groundwater collection and treatment system (the HCTS), DNAPL gauging and passive recovery, the presence of historical and recent cover materials, the existence of the new infiltration-resistant stormwater control system, and on-site consolidation and capping of impacted materials (including South Ditch soft soils and near-shore river sediments), and off-site source removal and disposal.

Under current Site conditions, the potential for Site-related exposures is considered to be minimal, as is the potential for off-site migration of any Site-related constituents. Figure 5 is a graphical representation of the CSM. This figure has been updated from the version originally presented in the Site Characterization Summary Report (KEY, March 2013) to incorporate information about groundwater quality in the area outside the slurry wall and the potential for direct contact with groundwater as well as recent stormwater sampling that confirm that under current conditions, no Site-related constituents are leaving the property via either the new storm drains or via groundwater discharge to the storm drains.

3.1 SOURCES OF CONTAMINATION

Since 1916, various forms of chemical manufacturing, processing or blending have occurred on the various parcels that make up the Site. These activities included naphthalene processing, dichlorobenzene and trichlorobenzene processing, battery manufacturing, and dye carrier blending operations. In addition, a variety of fill material has been emplaced at the Site. As a result, multiple classes of chemicals (volatile and semi-volatile organics (VOCs/SVOCs), PCBs, dioxins and furans, and metals have been detected in various environmental media over time.

Former source areas consisted of the following areas that have been remediated: chemical storage tanks and chemical processing operations, septic systems and tanks, an underground vault, wastewater treatment lagoons (dewatered, backfilled, solidified and capped) and wastewater discharges, a former PCB-transformer area (excavated), impacted surface materials and fill on the eastern and western portions of the property (removed and covered), soft soil formerly contained in the South Ditch, and DNAPL in the groundwater (contained within the barrier wall system).

The barrier wall system surrounds all of the former source areas, and ensures that no off-site migration from former source areas occurs. Data collected in 2013 as part of the RI/FFS conducted pursuant to the Agreement indicated the presence of residual DNAPL in subsurface soil located within the sand unit at the top of the varved clay and corresponding dissolved phase impact to groundwater located outside the barrier wall near the southwest corner of the Seaboard site. Evaluation of the extent of impact outside the barrier wall is ongoing.

3.2 FATE AND TRANSPORT

Chemicals may have been released to the environment via several mechanisms such as leaks and spills during former industrial manufacturing operations, storage and shipment; wastewater discharges; overflows from the former wastewater lagoons; erosion of surficial materials and subsequent overland flow/discharge to drainage ditches; and the placement of fill material from off-site sources and on-site sources.

This section presents a brief discussion of general fate and transport information for the major chemicals or classes of chemicals observed in various environmental media at the Site as well as general information indicative of chemical transport at the Site. In general, Site conditions appear to be somewhat favorable with respect to the attenuation of chemical constituents. Major classes of chemicals detected include chlorinated aromatic compounds such as chlorobenzene, dichlorobenzene isomers and 1,2,4-trichlorobenzene; polychlorinated biphenyls (PCBs)-; polychlorinated dibenzodioxins/polychlorinated dibenzofurans (PCDDs/PCDFs); and polycyclic aromatic hydrocarbons (PAHs). In addition, various metals have been detected in Site media, including total and hexavalent chromium.

The following general statements can be made relative to fate and transport of the major classes of chemicals found at the Site:

- The chlorinated benzenes and naphthalene (a PAH) are the more water soluble constituents observed in Site media. These compounds are considered to be more amenable to leaching from the soils and reaching the groundwater, where they could migrate in the dissolved phase (groundwater), than the PCBs, dioxins, and other PAHs. Further migration is governed by chemical- and aquifer-specific characteristics (e.g., aqueous solubility, organic carbon partition coefficients, permeability or Henry's Law constant).
- Dioxins, PCBs, and most PAHs have high organic carbon partition coefficients, and are more likely to adsorb to soil materials and hence are considered less mobile. Sorption to the soil matrix inhibits migration
- Chlorinated aromatics, PCBs and dioxins are generally considered to be resistant to natural biodegradation, while many lower molecular weight PAHs are more amenable to these processes.
- Transport of many metals, which are generally not highly soluble, occurs via particulate erosional mechanisms (e.g., runoff, wind erosion). Hexavalent chromium is a more soluble species, however it is readily reduced to the trivalent species in the presence of organic carbon (i.e., the Meadow Mat).

In general, Site conditions are favorable with respect to minimizing the transport of chemical constituents, especially with the presence of the underlying Meadow Mat and varved clay. The removal of source areas, construction of the Consolidation Area, upgrading of the storm sewers, and installation of the barrier wall also establish containment within contiguous areas of impact on the adjacent Diamond and Seaboard Sites.

3.3 MIGRATION PATHWAYS

A conceptual site model, developed initially for the Site Characterization Summary Report (KEY, March 2013), as well as the RI/FFS Work Plan (KEY, September 2013) indicated that the majority of potential migration pathways (and hence exposure scenarios) were incomplete under current Site conditions. That CSM has been updated and included as Figure 5. Under existing Site conditions, all potential migration pathways have been substantially addressed.

Installation of the slurry wall and steel sheet pile wall has effectively addressed the potential for discharge of constituents to adjacent properties (beyond the barrier wall) and the Hackensack River via subsurface routes. In addition, the slurry wall was designed to encompass the potentially mobile DNAPL that extended onto the Seaboard Site to the south of the Site and this objective was also accomplished.

The groundwater extraction and treatment system is fully operational and is effectively reducing the mobility and the volume of constituents in Site groundwater. The removal of soft soils from the South Ditch and near-shore sediments from the Hackensack River, in concert with construction of a water-tight stormwater management system, has also served to address potential overland transport pathways.

The construction of the SCCC Consolidation Area and the consolidation therein of various impacted materials under a multi-layer cap, coupled with the construction of the IRMs has served to address the potential for atmospheric transport of Site-related constituents. The IRMs and the Consolidation Area will require ongoing maintenance and monitoring. The presence of cover materials (i.e., asphalt, gravel, the multi-layer cap on the Consolidation Area, etc.) eliminates the potential for wind or runoff transport of surficial soil materials from beneath these covers.

VOCs in shallow soils and groundwater (above the Meadow Mat) at the Site present a potential for vapor intrusion into future occupied structures. Upward migration of volatile emissions from the soil or groundwater can enter a structure through foundations, basements, slabs, etc. if their integrity is breached or the materials used are air-permeable.

Off-site migration of volatiles or particulates could occur during soil disturbance. However, air monitoring results from sampling conducted during various response activities indicated that neither volatiles nor particulates presented the potential for adverse effects to on-site workers during major soil disturbance activities (i.e., the installation of the barrier wall, piping for the HCTS, etc.).

3.4 EXPOSURE MEDIA

This section presents a summary of the exposure media of concern, as described in the CSM (Figure 5). Only those media to which exposures might reasonably be expected to occur under either current or future site conditions, are discussed. If a medium has been addressed under an IRM or IRA, that medium (e.g., soft soils in the South Ditch, lagoon sediments or transformer area soils) is not addressed further in this section. In addition, exposures to surficial soils potentially eroded from the Site and transported via the enclosed stormwater system are not addressed because stormwater monitoring has shown that such releases are not occurring. Separate discussions of current and future potential Site conditions are included.

3.4.1 Current Site Conditions

Under current Site conditions, a limited number of media were considered as being potentially available for exposure, based on the CSM presented in Figure 5. The following media were evaluated:

On-Site Groundwater – Excluded from further consideration. Groundwater is not currently used for potable purposes. Groundwater and associated DNAPL within the barrier wall is collected and treated by the HCTS, and all operations are conducted with appropriate health and safety considerations for potential occupational exposures. No use of shallow groundwater occurs in the vicinity of the Site. In addition, an institutional control prohibiting groundwater use is in effect for the Site. A Classification Exception Area/Well Restriction Area (CES-2240) was established in 2003. A copy of the CEA is attached in Appendix A.

Off-Site Groundwater - Groundwater impacts outside the barrier wall are not under the control of the current hydraulic containment system. Evaluation of the extent of this impact is ongoing; however current impacts are within the groundwater CEA, therefore potential current exposure is excluded from further consideration.

Particulate and Volatile Emissions (Off-Site Exposures) - Excluded from further consideration. Real-time personnel air monitoring as well as perimeter air monitoring conducted during the implementation of various IRAs indicated that even when soil disturbances occurred, potential exposures to volatile organics in air or particulates were negligible. Appendix B contains summary tables of the air monitoring results for both personnel and perimeter air monitoring that was conducted in 2011. No residential areas are located in the immediate vicinity nor are the immediately adjacent properties occupied on a regular basis, thereby eliminating these off-site residential or employee populations from further consideration.

Volatile Emissions (On-Site Exposures) – Excluded from further consideration. The HCTS was constructed on a new cement slab with epoxy sealant, thereby eliminating upward migration of volatile emissions into the building. In addition, routine leak detection and stack emission monitoring is conducted as part of the air permit (PCP100002; Facility ID 12972) requirements.

Surface Soils – Because there are personnel involved in intermittent inspection activities and operation of the HCTS, direct, infrequent exposures to surface materials may occur *if* the existing cover materials are disturbed. Note that the entire surface is paved, covered with coarse gravel, or vegetated and these potential exposures are considered to be minimal.

Subsurface Soils – Excluded from further consideration under current land use conditions. Major remediation activities have been completed using proper health and safety techniques to minimize exposures to subsurface media. No current activities at the Site disturb the subsurface soil.

3.4.2 Future Site Conditions

Site media were also evaluated for exposure based on potential, reasonably expected future land use conditions. The rationale for inclusion or exclusion of various media follows:

On-Site Groundwater – Under future development scenarios, there is a slight potential for construction or utility workers to come into contact with shallow groundwater while involved in soil excavation. Best management practices would dictate that dewatering would be used given the shallow depth to groundwater absent the operation of the HCTS. In addition, the historic presence of volatile organics (chemicals most likely to permeate the skin during exposure) is limited in the shallow groundwater outside the limits of the Consolidation Area, and hence this potential exposure scenario is considered to be insignificant under future land use conditions. Incidental, direct contact with shallow groundwater will be addressed quantitatively in the BHHRA.

Off-Site Groundwater – Evaluation of the extent of impact outside the barrier wall is ongoing; however no current or reasonably anticipated future use is anticipated since groundwater use is subject to a CEA and the adjacent land is occupied by major transportation corridors (Belleville Turnpike). Evaluation of off-Site groundwater will be addressed qualitatively in the risk assessment.

Particulate and/or Volatile Emissions – Off-site exposures excluded from further consideration. On-site air monitoring results are available for on-site workers during the implementation of the interim remedial actions and showed minimal exposures of workers during long-term soil disturbing activities. The use of standard industry dust control measures will reduce potential future exposures significantly. Because on-site impacts were negligible, off-site outdoor receptors' impacts would be even lower and hence will not be addressed quantitatively in the risk assessment.

Future potential exposure to volatiles via vapor intrusion into an occupied structure is considered to be an additional potential on-site exposure pathway for future indoor adult employees. Volatile emissions originating in the shallow groundwater and soils (surface and subsurface) will be addressed quantitatively in the BHHRA.

Surface Soils – Under current Site conditions, the HCTS operators and site visitors may be exposed to surface soils on the Site as part of their job duties if the cover materials are disturbed for any reason. If the Site is redeveloped in some fashion, there is a potential for construction or utility workers to be exposed to surface media during certain discrete activities. In addition, redevelopment could also result in exposure of outdoor industrial workers such as landscapers on a more regular basis on the SCCC Site. On-site surface soils and fill material (below the processed dredge material) are retained for a worst-case quantitative assessment.

Subsurface Soils – Again, redevelopment and its associated construction/utility work may bring such workers into contact with subsurface soils at the SCCC Site. A depth of 10 feet was selected as the maximum likely depth of excavation given the presence of the Meadow Mat at a depth of about 10 feet on-site, and the fact that the depth to groundwater is artificially increased due to the operation of the HCTS. Therefore, subsurface soils are considered to represent a potential exposure medium.

Excavations of greater depths are highly unlikely, given the locally high water table, the need for dewatering under such conditions, and typical construction practices for industrial facilities at the Site (slab on grade).

3.5 EXPOSURE UNITS

Given the extensive nature of the IRMs and Response Actions conducted to date, it is necessary to consider the nature of potential exposures based on the current Site configuration. The exposure units addressed for the SCCC Site consist of the Western Area (Lots 48, 50 and 51), located west of the Railroad right-of way that parallels the River, and the Eastern Area (Lots 49 and 52), located between the right-of-way and the riverbank.

The Western Area surficial materials are primarily asphalt or coarse stone. There are a few existing historical structures, several foundations and slabs from building that have been removed (see Section 2.1), and the recently completed structure containing the HCTS. Small wetland areas exist on the western boundary of this area and near the HCTS. Stormwater is controlled with a man-made system of storm drains and catch basins that replaced the original open ditches.

The Eastern area consists primarily of the Consolidation Area which was constructed in the area formerly containing wastewater lagoons. It is a mounded area that received soil materials excavated from various portions of the property that were compacted and covered by geotextile fabric, 60-mil linear low-density polyethylene, drainage layer with an overlying geotextile fabric, 8 inches of structural fill, and 4 inches of topsoil. North of the Consolidation Area are several foundations/slabs, and the area is mostly covered by coarse gravel.

3.6 EXPOSURE PATHWAYS

Complete exposure pathways consisting of the exposure media discussed in Section 3.2 and identified potential receptors and exposure routes that will be carried through the quantitative risk assessment are summarized in Table 1. These complete or potentially complete exposure pathways are as follows:

Exposure Medium/Exposure Point	Current Land Use	Future Land Use
On-Site Surface Soil/Soil and Particulates	Site Visitors HCTS Operator	Site Visitors HCTS Operator Outdoor Industrial Worker
On-Site Subsurface Soil/Soil and Particulates		Construction Worker Utility Worker
On-Site Groundwater and Soil/Indoor Air		Indoor Industrial Worker
On-Site Groundwater/Groundwater		Construction Worker Utility Worker
Off-Site Groundwater		Qualitative Evaluation

While other exposure scenarios have been considered, they were removed from quantitative evaluation for the reasons summarized below:

<u>On-Site and Off-Site Groundwater/Potable Well</u> – No domestic or industrial water supply wells are located on the property or in the immediate Site vicinity. The Town of Kearny uses surface water supplies. Future installation of a potable well either on-site or off-site is considered to be highly unlikely, Groundwater use is prohibited via a Classification Exception Area (see Appendix A). Future potential use of groundwater both within the barrier wall and outside the barrier wall will be addressed qualitatively in the risk assessment.

<u>Off-Site Surface Soil/Particulate and Volatile Emissions (originating on-site)</u> – Extensive air monitoring conducted during various construction activities on the Site indicated that all exposures were either non-detected or within acceptable industrial exposure limits; therefore it can be concluded that exposures of off-site receptors would be lower. In addition, future off-site exposures to dust generated during construction scenarios would be low because the most heavily impacted materials have been excavated and emplaced in the Consolidation Area to which future intrusive activities will be prohibited. Elimination of this exposure is supported by air monitoring data contained in Appendix B.

4.0 SELECTION OF CHEMICALS OF POTENTIAL CONCERN

This section presents a summary of the process used to select chemicals of potential concern (COPCs) for evaluation in the BHHRA. Existing analytical results for soil samples collected during previous investigations at the Site will be included in the BHHRA. Historic samples collected from within the confines of the Consolidation Area and samples from locations that have been remedied are not included. Samples of native or fill materials remaining in their original locations are used for risk / hazard evaluation purposes.

An emphasis is placed on more recent data (e.g., from 2008 and later) as being most representative of current Site conditions. In addition, all samples from this period are complete with detection limits, which were not always available for historic data collection efforts. All these recent data were evaluated for data usability by KEY personnel familiar with laboratory procedures. The quantity and quality of data acquired from 2008 to the present is more than sufficient for estimation of baseline risks. Historic data are used to supplement the more recent results if detection limits are available and if the samples were analyzed for specific constituents of interest (e.g., chlorobenzenes, dioxin or hexavalent chromium) that may not have been analyzed in the more recent data.

4.1 DATA EVALUATION

This section presents a brief summary of the samples used in the determination of COPCs for the exposure units discussed in Section 3.5. Surface soil samples (those collected from depths of less than 2 feet) were used for the non-invasive, current and future exposure assessments. Combined surface and subsurface soil samples (collected from depths of 0 to 10 feet) were used to evaluate future exposure routes involving construction and excavation activities. A limiting depth of 10 feet was used because that is slightly deeper than the deepest groundwater measurements occurring within the barrier wall system and the approximate depth of the Meadow Mat.

Fill unit groundwater samples collected from areas outside the Consolidation Area (five monitoring points) were used for the selection of groundwater COPCs for the vapor intrusion pathway. These five samples were collected in 2008.

4.1.1 Western Portion of the Site

A total of 18 surface soil samples (0 to 2 feet deep) and 61 surface/subsurface soil samples (0 to 10 feet deep) were collected from the western portion of the Site. Any samples collected from areas prior to excavation were not addressed in this document. Analytical parameters varied over time. The most prevalent analytes in this area were dichlorobenzenes, polycyclic aromatic hydrocarbons (PAHs), 2,3,7,8-TCDD and several metals including lead, chromium and hexavalent chromium.

4.1.2 Eastern Portion of the Site

Eighteen surface soil samples (0 to 2 feet deep) and 23 surface/subsurface soil samples (0 to 10 feet deep) were collected and analyzed in this portion of the Site. Samples collected from areas beneath the

Consolidation Area and samples collected from areas prior to removal were not addressed in this document. Analytical parameters were not consistent through all samples, with PAHs and dioxin being the most commonly analyzed.

4.1.3 On-Site Groundwater

Groundwater samples collected from five on-site fill unit monitoring wells were collected in 2008. These samples were analyzed for volatile and semivolatile organic compounds, which are the primary constituents of interest in the assessment of the indoor air, vapor intrusion exposure scenario as well as the direct contact scenarios. Only the wells or piezometers outside the boundaries of the Consolidation Area are used in this assessment; future construction on the footprint of the Consolidation Area will not be permitted. Because of the small number of samples, the groundwater results were not considered separately for the Western and Eastern portions of the Site.

4.2 DATA USABILITY

Determination of data usability is the process of assuring that the quality of the data generated meets the intended use. USEPA (April 1992) provides guidance for data usability in risk assessments. The analytical data collected for the Site were evaluated with respect to data usability prior to inclusion in this risk assessment. The following data quality issues are addressed: detection limits; qualified data; and quality control samples.

Selecting the analytical method for optimal detection limits is critical for data usability assessment. If detection limits are consistently higher than risk-based comparison values, the confidence in the results of the risk assessment can be affected by the possibility that constituents are present (but not detected) at levels that could impact human health. The most recent sampling efforts provide the most reliable detection limits, however, should older data be used in supplement or if sample require dilution in the laboratory, there is a potential for elevated detection limits. Professional judgment will be used to determine whether a particular sample with elevated detection limits will be included in the BHHRA.

Qualified data must also be used appropriately in a risk assessment. Validated, qualified data are considered usable for this risk assessment with the exception of unusable or rejected ("R" qualified) results. There were no rejected results in the data sets used in this risk assessment. Data with results that are estimated ("J" qualified) are included, and data that were noted to be present in associated blank samples ("B" qualified), and data with confirmation column qualifiers ("P" or "G" qualified) are considered as positive detections and are therefore included.

Quality control samples such as method blanks, trip blanks, and matrix spike samples are not included in the risk assessment. The analytical results for field duplicate samples are averaged.

4.3 IDENTIFICATION OF CHEMICALS OF POTENTIAL CONCERN (COPCS)

The purpose of this section is to identify the constituents that will be evaluated quantitatively in the human health risk assessment. The basis for this screening is discussed in greater detail for each medium, but the primary purpose of the screening is to eliminate from further evaluation any constituent that will clearly pose a negligible contribution to the overall health risk. This section presents a summary of the analytical data used to identify constituents present at the Site, and the risk-based values to which these concentrations were compared, resulting in a subset of the original list of analytes. COPCs are defined as those chemicals present in a medium that will constitute the significant portion of the quantified risks associated with human exposures. Note that the simple selection of a constituent as a COPC does not necessarily indicate that it poses a health risk. It merely indicates that there is a need to evaluate the risk potential quantitatively.

Based on chemical-analytical data generated as a result of sampling and analysis over approximately 30 years, major constituents have been identified for the Site. The major constituents, or classes of constituents, are as follows:

- Chlorinated benzenes
- PAHs (primarily naphthalene)
- Polychlorinated Biphenyls (PCBs)
- Dioxins/Furans (PCDDs/PCDFs)
- Metals

While other specific analytes have been detected in various Site media, these constituents constitute the majority of the COPCs based on their historical use (or placement at the Site), their prevalence in environmental media, and the measured concentrations.

The maximum detected concentration of each analyte was compared to the appropriate USEPA Regional Screening Levels (RSLs) (USEPA, November 2013). In all cases, the levels corresponding to a target cancer risk of 1E-6 and a target Hazard Quotient of 0.1 were used for the screening. As per Appendix A, Section VIII of the Agreement, maximum detected concentrations are screened against the USEPA RSLs for "residential soil." In addition, "industrial soil" screening levels were also included because the Site and all surrounding areas are zoned for industrial uses. If a chemical has more than one criterion (i.e., exhibits both carcinogenic and non-carcinogenic health effects), then the lower of those two values was used for this initial comparison.

Analytes that exceeded only the residential RSLs are noted in the COPC selection tables, but will be eliminated from further quantitative analysis in the BHHRA for the following reasons:

- Those compounds that exceed only the more stringent residential RSL contribute only a very small portion of the total risks at the Site. A simple ratio of the maximum detected concentration to the RSL was calculated, and summed for all exceedances. The sums of the ratios for the residential exceedances were compared to the totals for all exceedances. Based on this approach, the input to the totals from chemicals that only exceeded the residential RSL and not the industrial RSL was found to be minimal (less than 5 percent of the total, and often less than one percent). Calculations for this procedure are presented in Appendix C. Therefore, when this information is considered in conjunction with the future land use, zoning and adjacent land use considerations, the total risks or the ultimate remedy for the Site would not be affected.

- The organic chemicals that exceeded only the residential RSLs are often not related to the major industrial processes conducted at the Site. These chemicals often included such analytes as phthalates, a limited number of volatile organics, phthalate esters, and dibenzofuran.
- Several additional PAHs exceeded only the residential RSLs (e.g. chrysene or indeno(1,2,3-cd)pyrene, but these were determined to contribute little additional risk via this comparison exercise (less than one percent).
- Metals such as chromium (total), and others such as aluminum, manganese, and iron, which are not related to SCCC activities, were frequently noted at concentrations greater than the residential RSL (and not the industrial RSL) but typically contribute less than one percent of the summed ratio totals (see Appendix C).

The tables presented in this section contain a summary of the detected analytes in a particular medium. The tables include the minimum and maximum detections (and the location of the maximum detected concentration), the frequency of detection, and a range of detection limits. If the maximum detection exceeded the corresponding criterion, that chemical was selected as a COPC. Additional information on other criteria to be considered (e.g., Safe Drinking Water Act Maximum Contaminant Levels for public water supplies) are also included if available. The final column of these tables presents the rationale for either inclusion or exclusion as a COPC.

4.3.1 On-Site Surface Soils

On-site surface soil samples are used to evaluate exposures of adults who may come into contact with surficial materials during a typical workday. These include persons such as the HCTS operators and occasional visitors who may be on the Site infrequently. On-site surface soils are divided into two areas – the Eastern portion of the property and the Western portion of the property.

Table 2.1 presents a summary of the chemicals detected in the surface soil samples collected on the Western portion of the property. PAHs and chlorobenzenes were the most frequently detected analytes in these samples. In addition, 2,3,7,8-TCDD (toxicity equivalents, TEQ) were noted in multiple samples. Aroclor-1260, while not detected as frequently as some other analytes, was measured at concentrations that exceeded the toxicity screening values and was therefore selected as a COPC. In addition, several metals were also selected, including arsenic, iron, lead and hexavalent chromium.

Table 2.2 presents a data summary for the surface soil samples collected on the Eastern portion of the property. As expected, the primary COPCs for this area are chlorobenzenes and PAHs. In addition, two aroclors (PCB-1254 and PCB-1260) and dioxin (expressed as 2,3,7,8-TCDD TEQ) were also selected based on their presence at concentrations that exceeded the screening values. None of the surface samples addressed in this area was analyzed for metals; all samples that were analyzed for metals were either excavated or stabilized and emplaced in the Consolidation Area, and are therefore not available for human contact.

4.3.2 On-Site Surface and Subsurface Soils

Surface soils and subsurface soils to a depth of approximately 10 feet (somewhat greater than the deepest depth to groundwater inside the barrier wall) are combined for the evaluation of certain exposure scenarios that involve soil disturbance, such as construction and utility work. Again, these results were segregated for the Eastern and Western portions of the Site.

A large number of samples were collected and analyzed from subsurface soils in the Western portion of the property, as shown in Table 2.3. Benzene, toluene, ethylbenzene, xylenes, chlorobenzenes, PAHs, PCB-1260 and dioxins (2,3,7,8-TCDD equivalents) were the most frequently detected organic analytes and were selected as COPCs. Metals selected as COPCs include antimony, arsenic, cobalt, iron, lead, thallium, vanadium, and hexavalent chromium.

In the eastern portion of the property, a similar range of chemical groups was found, as shown on Table 2.4. Of the organic compounds detected, chlorobenzenes, PAHs, PCBs, and dioxin were selected as COPCs. The list of metals that exceeded screening criteria in the Eastern area and selected as COPCs was more limited, with arsenic, cobalt, thallium, vanadium and hexavalent chromium detected at concentrations higher than their respective screening levels.

The COPCs selected in Tables 2.3 and 2.4 will also be used to address potential exposures to indoor air resulting from vapor intrusion. Migration of volatile organics and selected semi volatile organics will be addressed in this potential exposure scenario. The soil concentrations will be used to estimate potential indoor air concentrations using the Johnson and Ettinger Model (Environmental Quality Management, Inc., June 2003).

4.3.3 On-Site Groundwater

Analytical results for samples collected from four piezometers and one monitoring well will be used for the evaluation of potential risks associated either direct or indirect exposure to groundwater.

Direct exposures to groundwater during construction activities will be addressed using these five groundwater sampling points. For the direct contact scenarios, all volatile and semi volatile organic compounds were considered as COPCs for direct contact if they were present at concentrations that exceed the corresponding screening levels for tap water. This selection process is documented in Table 2.5.

For the potential future installation of an industrial or commercial building on the Site, the same five samples were used. All detected analytes present at concentrations greater than the groundwater screening levels that correspond to a 10^{-5} risk as per USEPA guidance Section IV.C (Table 2b; USEPA, November 2002) were selected as COPCs. The COPCs for vapor intrusion from groundwater are benzene and naphthalene. Table 2.6 presents a summary of the groundwater analytical results and the selection of COPCs for the vapor intrusion scenario.

5.0 EXPOSURE ASSESSMENT

Exposure assessment is the process of estimating the magnitude, frequency and duration of human exposure to a constituent in the environment. This section of this report discusses the mechanisms by which people might come into contact with constituents in certain media and the approximate magnitude, frequency, and duration of that contact. The quantitative assessment of exposure, based on chemical concentrations and the degree of absorption of that chemical, provides the basis for estimating chemical uptake (dose) and associated health risks. This exposure assessment follows the current USEPA recommendations on exposure parameters and assumptions.

5.1 EXPOSURE PATHWAYS

An exposure pathway describes the route that a chemical takes from its environmental source (e.g., soil) to a human receptor. An exposure pathway has the following elements: (1) a source or chemical release from a source; (2) an exposure medium; (3) a point of potential contact for the receptor with the exposure medium; and (4) an exposure route at the point of contact (e.g., ingestion). An exposure pathway is considered to be complete when all four of these components exist. When one of these components is missing, eliminated or controlled, the exposure pathway is considered incomplete.

Once chemicals are released into the environment, they may migrate from one medium to another. Complete exposure pathways involve contact with a medium that contains elevated levels of a constituent. Only complete, or potentially complete, exposure pathways are addressed in a risk assessment.

Table 1 presented a summary of all current and future exposure pathways addressed in this assessment. Quantitative assessment of the following exposure scenarios will be presented in the BHHRA:

- <u>Potential contact with on-site surface and/or subsurface soils</u> – COPCs were detected in on-site surface soils at concentrations that exceeded risk-based screening levels, as described in the preceding section. This pathway is currently insignificant because there are no current full-time outdoor employees at the Site and surface covers are in place. However, HCTS operators performing wellhead maintenance or an intermittent Site visitor such as an inspector could be exposed to surface soils under both current and future conditions. Under future potential Site conditions, perhaps where the Site is redeveloped, it is considered possible that construction or utility workers may experience a short-term exposure during such work. The scenario of a full-time, outdoor industrial worker such as groundskeepers is also addressed for future Site conditions.

- <u>Potential direct contact with on-site groundwater during construction activities</u> – The presence of volatile and semivolatile organic compounds in shallow (fill unit) groundwater may occur under future land use conditions. Exposures during construction would be limited to dermal contact and incidental ingestion.

- Potential inhalation of volatile and semivolatile organics from indoor air – This potential vapor intrusion scenario will be addressed for future, full-time adult employees in a commercial or industrial setting. Vapor intrusion through building slabs, foundations, etc. will be considered.

Under current Site conditions, there are no known complete exposure pathways. The completed IRMs and IRA have covered and/or capped all surficial materials, removed significant structures with the exception of four historical structures associated with the historic operations of Thomas A. Edison, Inc., encircled the Site and all or parts of adjacent properties with a subsurface barrier wall system, excavated impacted soils for off-site disposal, stabilized soft surficial materials in the former lagoons, and removed sediments and impacted soils and placed them in an engineered Consolidation Area within the Site. An occasional Site visitor or the HCTS operators performing outdoor tasks are considered to conservatively estimate current exposures should they encounter unvegetated/uncovered soil materials beneath the surface covers. The HCTS building has a new, intact concrete slab which is sealed with an epoxy coating, therefore potential indoor exposures under current Site conditions are not evaluated.

However, the absence of significant complete exposure pathways relies on the maintenance of these engineered controls and a continued prohibition against uncontrolled disturbance of the cover materials. Although development of groundwater as a drinking water source is considered a virtual impossibility in this area, the current Classification Exception Area is considered an appropriate and necessary response. Access to the Site is restricted by a chain-link fence along Belleville Turnpike, and major roadways and access ramps as well as railroad tracks along the Seaboard Site south of the Site. These difficult access conditions greatly reduce the potential for trespassers to access the Site.

Under foreseeable circumstances, the primary potential future exposure routes are associated with disturbance of the soil by construction or utility workers and potential exposures to these workers via inhalation of fugitive dust or dermal contact with and incidental ingestion of the soils located beneath the cover materials or exposures of full-time outdoor employees after Site redevelopment. Additional potential direct contact and incidental ingestion of shallow groundwater in the soil disturbance scenarios will also be addressed. However, these potential exposures can be effectively managed via administrative controls (i.e., the establishment of procedures to be followed during any future construction that potentially involves disturbance of the IRM/IRA covers), routine health and safety measures, dewatering, and industry-standard dust control measures. Such measures will also mitigate air and water erosion of particulates with subsequent off-site transport and exposure.

Finally, potential indoor air exposures will be addressed to fully evaluate potential risks associated with the future development of the property. Both soil and groundwater sources of volatile and semivolatile organics will be evaluated, but because these media exist in equilibrium, individual constituents will not be double-counted (i.e., included for both media – only the higher of the two contributions will be included in the final calculations).

5.2 CHARACTERIZATION OF POTENTIAL RECEPTORS

The potential populations of human receptors at the Site are characterized in order to evaluate potential exposure pathways. Potential receptors for the Site were identified based on current and predicted future land use scenarios. Currently, the Site is undeveloped with the exception of the HCTS facility.

Current on-site receptors are limited to the intermittent exposure of personnel such as HCTS operators or inspection staff (visitors). In the future, it is possible that the Site will be redeveloped for heavy commercial or industrial uses (based on zoning), where outdoor exposures will be limited. Because of the potential for redevelopment, construction workers, utility workers, and outdoor industrial workers such as groundskeepers are evaluated.

In summary, the following potential receptors are considered:

- Occasional visitors (current and future)
- HCTS operators (current and future)
- Outdoor industrial workers (future)
- Construction and utility workers (future)
- Indoor industrial workers (future)

On-site exposures of adults to soils are addressed for both the Eastern and Western portions of the property. Reasonable future land use considerations were selected based on the Meadowlands Commission's Redevelopment Plan and the existence of deed restrictions limiting disturbance of the Consolidation Area.

Full-time HCTS operators are assumed to be adults who are on the Site every working day. Based on a typical work day, the operators are inside the building most of the day, but may be outdoors for a few hours to perform equipment maintenance and inspections. Exposures could occur via ingestion of and dermal contact with soils. Inhalation is also considered for the operators because of the presence of low concentrations of volatile organics in surface soils and the potential for some dust generation in areas that may not be well-vegetated. Indoor inhalation is not considered for reasons previously mentioned.

Occasional visitors are assumed to be adults who are intermittently on the Site. It is assumed that these visitors are exposed only to COPCs found in the surface soils, in this case, assumed to be found at a depth of less than 2 feet. Exposures are assumed to occur via incidental ingestion of and dermal contact with the surficial materials, should the cover materials be breached in any way. Inhalation is considered for on-site receptors because of the presence of low concentrations of volatile organics in surface soils and the potential for some dust generation in areas that may not be well-vegetated.

Future outdoor industrial workers are considered to be full-time adult employees working outdoors approximately 225 days/year. These personnel are assumed to be groundskeepers or others whose work requires them to be outdoors all or most of a day. Ingestion, dermal contact, and inhalation of volatiles/fugitive dust are considered.

The construction worker (or utility worker) is an adult whose work brings them into contact with surface and subsurface soils on a limited basis. Exposures are assumed to occur over a short-term (e.g., 4 month) period while such digging or construction would occur. Ingestion, dermal contact and inhalation of volatile or fugitive dust emissions are addressed. In addition, incidental ingestion of and dermal contact with shallow (fill unit) groundwater are also addressed.

Finally, exposure via inhalation of indoor air (the vapor intrusion scenario) is considered for future land use conditions where the Site is redeveloped. The potential receptor is assumed to be an adult working full-time indoors (250 days/year).

It is important to note that residential, recreational, or other residential-like uses (schools, day care centers, etc.) are eliminated from consideration in the PAR as potential receptor populations based on current and/or anticipated future land use restrictions and institutional controls that are assumed to remain in place for the foreseeable future for Site and surrounding sites.

5.3 EXPOSURE POINT CONCENTRATIONS

Potential exposure to constituents in the environment is directly proportional to the concentrations of those constituents in environmental media, known as exposure point concentrations (EPCs). The analytical results for samples from a given area or medium are combined to derive a single EPC for each COPC that conservatively represents the concentration of that chemical to which potential receptors may be exposed.

For the Reasonable Maximum Exposure soil exposures, the EPCs were statistically determined from the sampling data using the USEPA's statistical program, ProUCL 5.0. Upper Confidence Limits (UCLs) were determined using the full data sets ("all data, with NDs"), including non-detected values for all distribution types. Statistical analyses were performed by the program for "all data, with NDs" for all distribution possibilities. Based on the results generated by the software, an appropriate UCL was selected for use in the quantitative risk assessment. If the calculated UCL exceeded the maximum detected concentration, the maximum detected concentration was selected as the EPC. If there was only a single detection, UCLs were not calculated, and the concentration of the single "hit" became the EPC.

For groundwater exposures (via direct contact or indirectly via vapor intrusion), the maximum detected concentrations in the fill unit samples collected outside the Consolidation Area are used as the EPCs.

A simple arithmetic mean, calculated using the detection limits and any positive detections, was determined and used in the estimation of risks associated with the Central Tendency Exposure (CTE) scenarios. Again, if the mean exceeded the maximum detection (as a result of elevated detection limits), the maximum detection was used as the EPC for the CTE scenarios.

The EPCs for the RME and the CTE scenarios are presented on a series of tables. Tables 3.1.RME and 3.1.CT present the EPC evaluation for the Western Area surface soils. Eastern Area surface soils are addressed in Tables 3.2.RME and 3.2.CT. Similarly Western Area subsurface soil EPCs are presented in Tables 3.3.RME and 3.3.CT, while the Eastern Area subsurface soils are presented in Tables 3.4.RME and 3.4.CT. Tables 3.5.RME and 3.5.CT present information for the groundwater direct contact scenario, and Tables 3.6.RME and 3.6.CT contain EPCs for the groundwater/vapor intrusion scenario.

Each of these tables includes information on the mean, UCL and maximum detected concentrations, as well as the selection of the appropriate EPC and the statistics and rationale to support the selection of the exposure concentrations to be used in the quantitative risk assessment. While potential "sources", or locations with notably elevated concentrations of one or more analytes (outliers), are not eliminated from the data base, the BHHRA will include modifying discussions as needed. Such outliers may not be used to eliminate a COPC from further evaluation, but note of them may be made in the BHHRA or the FFS in support of remedial alternative selection and/or implementation.

5.4 ESTIMATION OF EXPOSURE AND INTAKE

In order to complete an exposure assessment, it is necessary to estimate the nature and magnitude of potential human exposures to Site-related chemicals of potential concern that were either measured or modeled in the affected media, considering both current and future potential land uses. To provide a range of potential exposures and risks, both the Reasonable Maximum Exposure (RME) and a Central Tendency Exposure (CTE) exposure will be evaluated (USEPA, December 2001b).

The RME represents an estimate of the high-end, or reasonable worst-case, exposure of a particular population, and is based on a combination of both average and high-end exposure estimates (representing the 90th or 95th percentiles of a parameter. The CTE represents an estimate of an average, or typical, exposure of a population and is based on central estimates of exposure parameters. This section presents a summary of the exposure parameters used in the Human Health Risk Assessment.

An exposure occurs when a human receptor comes into contact with a chemical in the environment such as soil or groundwater. The chemical must first come into contact with the human body, and then pass through a boundary from outside to inside the body, which is defined as an intake. For most exposure routes, intake is evaluated in terms of how much of the carrier medium containing the chemical crosses the boundary (e.g., the amount of soil ingested). Dermal contact pathways are evaluated in terms of uptake, or the absorption of the chemical through the skin.

Two types of doses, applied and internal, are defined for evaluating chemical exposure. The applied dose is the amount of a chemical present at an absorption barrier such as the lung, skin, or gastrointestinal tract and available for absorption. The applied dose is estimated as the amount of chemical ingested, inhaled or contained in the material touching the skin. It is analogous to the administered dose in a dose-response experiment. The internal dose is the amount of a chemical actually absorbed across the barrier and available for biological interactions. It is the portion of the internal dose that actually reaches cells or membranes where adverse effects can occur. Doses are generally presented as a mass per unit time on a per unit of body weight basis.

Non-carcinogenic health effects are evaluated by calculating the average intake of a chemical over the period of exposure. This value is the Average Daily Dose (ADD). Potential carcinogenic health effects are evaluated in terms of an individual's theoretical increased risk of developing cancer over a lifetime. Although the duration of exposure generally does not last for an entire lifetime, carcinogenic intakes are estimated as the average dose over a lifetime, because effects can occur long after the exposure period. This dose is the Lifetime Average Daily Dose (LADD).

The ADD and the LADD are quantified using assumptions about the duration, frequency and magnitude of exposure experienced by each potential receptor, as well as assumptions about the chemical properties that influence absorption. The equations used to estimate ADD and LADD for each receptor population are included in Tables 4.1 through 4.6.

5.5 ESTIMATION OF CHEMICAL ABSORPTION

5.5.1 Gastrointestinal Availability

The amount of a chemical that actually penetrates the exchange boundaries of the body is the absorbed dose. Toxicity studies that provide the basis for the health effects criteria (reference doses and cancer slope factors) generally report health effects as a function of applied doses rather than absorbed doses. These criteria are therefore most correctly compared to calculations of potential applied doses. In addition, animal toxicity studies often provide chemicals in food or water which readily allows for absorption. The fraction of a chemical that is absorbed from soil is typically less that the fraction absorbed from food or water. Guidance therefore indicates that reference doses (RfDs) are usually based on or have been adjusted to reflect drinking water exposure (USEPA, December 1989). For COPCs in soil, the USEPA recommends using gastrointestinal absorption factors of 100%, which is a conservative approach to risk estimation.

5.5.2 Dermal Absorption of Chemicals from Soil

The administered dose in a dermal exposure pathway is the amount of a constituent in the volume of soil contacting the skin. Only a small fraction of this amount will actually penetrate the skin barrier and enter the body of a receptor. Dermal exposure calculations are therefore always calculated as an absorbed dose and require the inclusion of a dermal absorption fraction (ABS).

USEPA guidance (USEPA, July 2004) provides ABS for several constituents, as follows:

- PAHs – 0.13
- PCBs – 0.14
- Other semivolatile organics – 0.1
- Dioxins – 0.03
- Antimony – 0.15
- Arsenic – 0.03
- Barium – 0.07
- Beryllium – 0.007

- Cadmium – 0.025
- Chromium - 0.13
- Hexavalent Chromium – 0.025
- Thallium – 1.0
- Vanadium – 0.026

The guidance recommends the use of an absorption rate of 100 percent for all organics and inorganics (e.g., lead) not specifically indicated in the guidance.

In order to determine the appropriate reference dose for evaluation of dermal contact scenarios, it is necessary to adjust the oral toxicity factors as follows:

Absorbed RfD = Oral RfD (mg/kg-day) * ABS

Volatile organics are not evaluated via the dermal route of exposure – they are considered in the inhalation pathway because of their propensity to volatilize rapidly before absorption could occur. For other inorganics, the data are insufficient to extrapolate a reasonable default value because the speciation of a metal is critical to dermal absorption (USEPA, July 2004).

5.5.3 Dermal Absorption of Chemicals from Water

Pathways that involve dermal contact with water require the inclusion of a dermal permeability constant (K_p) in the exposure calculations. The dermal permeability factor accounts for the movement of the chemical from the water, across the skin to the stratum corneum and hence into the bloodstream. Because dermal permeability constants are based on equilibrium partitioning, they are likely to overestimate the amount of a chemical absorbed during short term exposure periods such as those considered for this risk assessment.

USEPA guidance (July 2004) presents K_p values for several constituents. For organics, the K_p values were obtained from Exhibit B-2, and for inorganics, K_p values were obtained from Exhibit 3-1 of this reference.

5.6 EXPOSURE ASSUMPTIONS

The quantitative estimation of chemical intake involves the incorporation of numerical assumptions for a variety of exposure parameters. Where guidance was available, exposure assumptions used in the intake calculations are based on USEPA recommended values. However, because default assumptions are not available for every parameter, best professional judgment was used based on Site-specific characteristics. All exposure assumptions used in the risk assessment are discussed in this section and are presented on Tables 4.1 through 4.6.

5.6.1 Assumptions Common to all Pathways and Receptors

The following factors are used in all exposure pathways addressed for this Site:

Body Weight (BW)

According to recent USEPA guidance (USEPA, September 2011), adult body weights are set at 80 kg and children ages 0 to 6 years have body weights of 15 kg. The same values were used for both the CTE and the RME scenarios.

Averaging Time (AT)

Because doses for non-carcinogenic health effects are averaged over the specific period of exposure, non-carcinogenic averaging times are calculated by multiplying the particular exposure duration by 365 days/year. Carcinogenic health effects are calculated for a lifetime, so the averaging time for carcinogenic effects is 28470 days, which represents a recommended lifetime of 78 years (USEPA, September 2011) multiplied by 365 days/year.

Dermal Absorption Fraction (ABS)

Dermal absorption fractions were presented in Section 5.5.2. These values will be used in each scenario addressing dermal contact with soil.

5.6.2 Equations Used to Estimate Intakes/Doses

Standard equations are used to estimate chemical intake under various combinations of receptors and exposure media. This section presents the equations, which are also included in Tables 4.1 through 4.8 for each combination of timeframe, exposure medium and receptor. Section 5.6.3 presents receptor-specific variables used for the current and future HCTS Operators working on-site and Section 5.6.4 presents the variables used for Site visitors. Variables used for construction or utility workers are discussed in Section 5.6.5, and variables for the future outdoor industrial worker are presented in Section 5.6.6. Section 5.6.7 presents the variables used for future groundwater users.

Soil Ingestion

Intake via incidental ingestion of soil is estimated using the following equation:

$$\text{Intake} = CS \times SI \times CF \times FI \times EF \times ED \times 1/BW \times 1/AT$$

Where:
Intake = Average daily intake of a chemical via ingestion (mg/kg-day)
CS = Chemical concentration in soil (mg/kg)
SI = Soil ingestion rate (mg/day)
CF = Conversion factor (1E-6 kg/mg)
FI = Fraction of total soil intake derived from the site (unitless)
EF = Exposure frequency (days/year)
ED = Exposure duration (years)
BW = Receptor body weight (kg)

AT = Averaging time = ED x 365 days/year

Dermal Contact with Soil

The amount of a chemical absorbed from soil through the skin is estimated using the following equation:

$$DAD = Da_{event} \times EF \times ED \times EV \times SA \times 1/BW \times 1/AT$$

Where:

DAD = Dermally absorbed dose (mg/kg-day)
Da_{event} = Absorbed dose per event (mg/cm^2)
EF = Exposure frequency (days/year)
ED = Exposure duration (years)
SA = Skin surface area available for contact (cm^2)
BW = Receptor body weight (kg)
AT = Averaging time = ED x 365 days/year

Da_{event} is calculated as follows:

$$Da_{event} = CS \times CF \times AF \times ABS$$

Where:

CS = Chemical concentration in soil (mg/kg)
CF = Conversion factor (1E-6 kg/mg)
AF = Adherence factor of soil to skin (mg/cm^2)
ABS = Dermal absorption fraction (unitless)

Inhalation of Volatile Emissions and Fugitive Dust

Inhalation intakes are estimated using the following equation:

$$Intake = CS \times IR \times CF \times ET \times EF \times ED \times (1/VF + 1/PEF) \times 1/BW \times 1/AT$$

Where:

Intake = Average daily intake of a chemical via inhalation (mg/kg-day)
IR = Inhalation rate (m^3/min)
CF = Conversion factor (60 min/hour)
ET = Exposure time (hour/day)
EF = Exposure frequency (days/year)
ED = Exposure duration (years)
VF = Chemical-specific volatilization factor (m^3/kg)
PEF = Particulate emission factor (1.4E+9 m^3/kg)
BW = Receptor body weight (kg)
AT = Averaging time = ED x 365 days/year

Chemical-specific volatilization factors are presented in Appendix D. The USEPA default particulate emission factor was used for all soil disturbance scenarios.

Incidental Ingestion of Groundwater

Estimation of chemical intakes via incidental ingestion of groundwater in a construction/excavation scenario uses the following equation:

$$Intake = CW \times IR_w \times EF \times ED \times 1/BW \times 1/AT$$

Where:

Intake = Average daily intake of a chemical via water ingestion (mg/kg-day)
CW = Chemical concentration in water (mg/L)
IR_w = Water ingestion rate (L/day)
EF = Exposure frequency (days/year)
ED = Exposure duration (years)
BW = Receptor body weight (kg)
AT = Averaging time = ED x 365 days/year

Dermal Contact with Groundwater

The amount of a chemical absorbed through the skin from a film of water on the outer skin surface is estimated as follows:

$$DAD = Da_{event} \times SA \times EV \times EF \times ED \times 1/BW \times 1/AT$$

Where:

DAD = Dermally absorbed dose (mg/kg-day)
Da_{event} = Absorbed dose per event (mg/cm^2-event)
SA = Skin surface area (cm^2)
EV = Event frequency (1 event/day)
EF = Exposure frequency (days/year)
ED = Exposure duration (years)
BW = Receptor body weight (kg)
AT = Averaging time = ED x 365 days/year

The method to estimate the Da_{event} varies with the event duration. If the event duration is less than the time required for a chemical to reach steady-state, the following equation is used:

$$\text{If } t_{event} \leq t^*, \text{ then } Da_{event} = 2FA \times K_p \times CW \; SQRT(6\tau_{event} \times t_{event}/\pi)$$

Where:

t_{event} = Event duration (hour/event)
t^* = Time to reach steady state (hour)
FA = Fraction absorbed from water (assumed to be 100%; unitless)

K_p = Chemical-specific dermal permeability coefficient (cm/hour)
CW = Chemical concentration in water (mg/L)
τ_{event} = Chemical-specific lag time per event (hour)

If the event duration is greater than the time required for a chemical to reach steady-state, the following equation is used:

$$\text{If } t_{event} > t^*, \text{ then } Da_{event} = FA \times K_p \times CW \left[t_{event}/(1+B)\ 2\tau_{event}\left((1 + 3B + 3B^2)/(1 + B)^2\right)\right]$$

Where:

B = Chemical-specific ratio of permeability coefficient through stratum corneum to permeability coefficient through epidermis (unitless)

USEPA recommended values (USEPA, July 2004) for t^*, K_p, τ_{event}, and B are presented in Appendix D.

Inhalation of Volatiles Resulting from Vapor Intrusion

Exposure via inhalation of volatile or semivolatile organic constituents in indoor air, which originate either from subsurface soils or shallow groundwater, will be estimated using the Johnson and Ettinger Model (Environmental Quality Management, Inc., June 2003). Spreadsheets developed for this model will be used to calculate exposures and risks associated with vapor intrusion. Both the soil (0 to 10 foot depth) and the shallow (fill unit) groundwater samples will be addressed as separate components of potential future inhalation exposures.

Air concentrations inside a future building are estimated in this model by using some standard default assumptions regarding source size, air exchange rates, and soil characteristics (coarse-grained "sand" is assumed to correspond to the fill material as a worst-case scenario). Site-specific soil and groundwater analytical results will be used as input. If a COPC was identified in both the groundwater and the soil for the vapor intrusion scenario, it will only be included in the matrix resulting in the higher risk.

5.6.3 HCTS Operator Exposure Parameters (Current and Future)

Under current and future land use scenarios, the full-time adult operators of the HCTS facility will be addressed using the following parameters to assess potential exposures to surface soils:

Parameter and Abbreviation		CTE		RME	
IR_s	Soil Ingestion Rate (mg/day)	50	USEPA, September 2011	200	USEPA, September 2011
FI	Fraction Ingested from Site	0.5	Professional judgment	0.5	Professional judgment
EF	Exposure Frequency (days/yr)	225	USEPA, December 2002	225	USEPA, December 2002
ED	Exposure Duration (yr)	5	Bur. of Labor Statistics, 2012	25	USEPA, December 1989
AF	Soil Adherence Factor (mg/cm^2)	0.02	USEPA, July 2004	0.1	USEPA, July 2004
SA	Skin Surface Area (cm^2)	3300	USEPA, July 2004	3300	USEPA, July 2004
IR	Inhalation Rate (m^3/min)	0.012	USEPA, September 2011	0.016	USEPA, September 2011
ET	Exposure Time (hr/day)	2	Professional judgment	4	Professional judgment

It is assumed that since this activity does not involve ground disturbance, only half of a person's daily intake of soil occurs at the Site. Exposure frequency is the commonly used value for full-time employees.

The exposure duration of 5 years represents the average job tenure. The 25 year exposure duration is a conservative standard default assumption for job tenure. Soil adherence factors are based on the geometric mean and the 95th percentile for groundskeepers. Exposed skin surface area available for contact was assumed to be 3300 cm^2, equal to the head, hands and forearms. Inhalation rates are based on the mean and 95th percentiles for light intensity activity. Time spent outdoors was set at 2 hours/day for the CTE, and 4 hours/day for the RME, based on typical and conservative workday patterns for current employees.

Estimation of intakes via all exposure routes was performed using the equations presented in the previous section. Additional details on input parameters and equations used to estimate the intakes for this receptor are contained in Tables 4.1.CT and Table 4.2.RME.

5.6.4 On-Site Visitor

Under current and future land use scenarios, the following assumptions were selected to evaluate exposures of occasional on-site visitors such as inspectors or maintenance personnel (e.g., fence repair, etc.) who may come into contact with surface soils:

Parameter and Abbreviation		CTE		RME	
IR_s	Soil Ingestion Rate (mg/day)	50	USEPA, September 2011	200	USEPA, September 2011
FI	Fraction Ingested from Site	0.5	Professional judgment	0.5	Professional judgment
EF	Exposure Frequency (days/yr)	50	Professional judgment	100	USEPA, December 2002
ED	Exposure Duration (yr)	5	Bur. of Labor Statistics, 2012	25	USEPA, December 1989
AF	Soil Adherence Factor (mg/cm^2)	0.02	USEPA, July 2004	0.1	USEPA, July 2004
SA	Skin Surface Area (cm^2)	3300	USEPA, July 2004	3300	USEPA, July 2004
IR	Inhalation Rate (m^3/min)	0.012	USEPA, September 2011	0.016	USEPA, September 2011
ET	Exposure Time (hr/day)	8	Professional judgment	8	Professional judgment

It is assumed that since this sort of activity does not involve ground disturbance, only half of a person's daily intake of soil occurs at the Site. Exposure frequencies are based on one or two visits per week to the Site. The exposure duration of 5 years represents the average job tenure. The 25 year exposure duration is a conservative standard default assumption for job tenure. Soil adherence factors are based on the geometric mean and the 95th percentile for groundskeepers. Exposed skin surface area available for contact was assumed to be 3300 cm^2, equal to the head, hands and forearms. Inhalation rates are based on the mean and 95th percentiles for light intensity activity.

Estimation of intakes via all exposure routes was performed using the equations presented in the previous section. Additional details on input parameters and equations used to estimate the intakes for this receptor are contained in Tables 4.1.CT and Table 4.2.RME.

5.6.5 Construction Worker/Utility Worker

Should the Site be redeveloped, it is necessary to evaluate potential exposures of construction workers or utility workers who may be on-site for a one-time construction or installation event. It is assumed that these persons are adults who may be exposed to both surface and subsurface soils as well as shallow groundwater during earthmoving activities. The following table presents a summary of exposure parameters for the construction worker:

Parameter and Abbreviation		CTE		RME	
IR_s	Soil Ingestion Rate (mg/day)	100	USEPA, November 2013	330	USEPA, December 2002
FI	Fraction Ingested from Site	1	Professional judgment	1	Professional judgment
EF	Exposure Frequency (days/yr)	60	Professional judgment	130	Professional judgment
ED	Exposure Duration (yr)	1	Professional judgment	1	Professional judgment
AF	Soil Adherence Factor (mg/cm^2)	0.2	USEPA, July 2004	0.8	USEPA, July 2004
SA	Skin Surface Area (cm^2)	557	USEPA, September 2011	557	USEPA, September 2011
IR	Inhalation Rate (m^3/min)	0.027	USEPA, September 2011	0.038	USEPA, September 2011
ET	Exposure Time (hr/day)	8	Professional judgment	8	Professional judgment
IR_w	Groundwater Ingestion Rate (L/day)	0.09	Professional judgment	0.27	Professional judgment
SA_w	Skin Surface Area (cm^2)	421	USEPA, September 2011	421	USEPA, September 2011

Utility worker exposure parameters are presented in the following table:

Parameter and Abbreviation		CTE		RME	
IR_s	Soil Ingestion Rate (mg/day)	100	USEPA, November 2013	330	USEPA, December 2002
FI	Fraction Ingested from Site	1	Professional judgment	1	Professional judgment
EF	Exposure Frequency (days/yr)	20	Professional judgment	40	Professional judgment
ED	Exposure Duration (yr)	1	Professional judgment	1	Professional judgment
AF	Soil Adherence Factor (mg/cm^2)	0.2	USEPA, July 2004	0.8	USEPA, July 2004
SA	Skin Surface Area (cm^2)	557	USEPA, September 2011	557	USEPA, September 2011
IR	Inhalation Rate (m^3/min)	0.027	USEPA, September 2011	0.038	USEPA, September 2011
ET	Exposure Time (hr/day)	8	Professional judgment	8	Professional judgment
IR_w	Groundwater Ingestion Rate (L/day)	0.09	Professional judgment	0.27	Professional judgment
SA_w	Skin Surface Area (cm^2)	421	USEPA, September 2011	421	USEPA, September 2011

For jobs involving soil disturbance, greater ingestion rates were used, and it was assumed that essentially all of a person's incidental ingestion of soil occurred during this activity. An exposure frequency representing approximately 6 months and an exposure duration of 1 year were used for the central tendency, while a one year exposure frequency and duration were used for the RME scenario. Soil adherence factors are based on the geometric mean and the 95th percentiles for construction and utility workers. Inhalation rates are based on the mean and 95th percentiles for moderate intensity activities. Exposed skin surface area for soil contact for the construction and utility worker is assumed to be the head, arms, and hands (557 cm^2)

Exposures to groundwater are assumed to be minimal. Incidental water ingestion rates were set at 10 percent of the mean and 95th percentile tap water ingestion rates. It is considered to be highly unlikely that workers would be exposed to groundwater 8 hours/day given that this would be unacceptable to an employee and given the fact that the high water table would require dewatering for any major project. Therefore, an intermittent exposure of 2 hours/day was assumed. Exposed skin area is assumed to be hands and arms only (421 cm^2). Best management practices would certainly minimize the exposure to groundwater in an excavation.

Estimation of intakes via all exposure routes was performed using the equations presented in Section 5.6.2. Additional details on input parameters and equations used to estimate the intakes for this receptor are contained in Tables 4.3.CT and Table 4.4.RME for soils, and Tables 4.5.CT and 4.5.RME for groundwater.

5.6.6 Outdoor Industrial Worker

Redevelopment of the Site and the resulting change in land use could result in the employment of full-time groundskeepers or similar employees who would work outdoors. The following exposure parameters were used to evaluate such adult personnel:

Parameter and Abbreviation		CTE		RME	
IR_s	Soil Ingestion Rate (mg/day)	50	USEPA, September 2011	200	USEPA, November 2011
FI	Fraction Ingested from Site	0.75	Professional judgment	0.75	Professional judgment
EF	Exposure Frequency (days/yr)	225	USEPA, December 2002	225	USEPA, December 2002
ED	Exposure Duration (yr)	5	Bur. of Labor Statistics, 2012	25	USEPA, December 1989
AF	Soil Adherence Factor (mg/cm^2)	0.02	USEPA, July 2004	0.1	USEPA, July 2004
SA	Skin Surface Area (cm^2)	3300	USEPA, July 2004	3300	USEPA, July 2004
IR	Inhalation Rate (m^3/min)	0.013	USEPA, September 2011	0.016	USEPA, September 2011
ET	Exposure Time (hr/day)	8	Professional judgment	8	Professional judgment

The types of jobs that do not involve soil disturbance were evaluated using the central tendency and upper percentile soil ingestion rates. Under these circumstances, it was assumed that the majority (75%) of a person's daily intake of soil would occur during the working day. Full-time outdoor employees spend approximately 225 days/year outdoors, and exposure durations were 5 and 25 years as used previously. Soil adherence factors represent the geometric mean and the 95th percentiles for groundskeepers. Inhalation rates representing approximate mean and 95th percentile values for light intensity activities were used.

Estimation of intakes via all exposure routes was performed using the equations presented in Section 5.6.2. Additional details on input parameters and equations used to estimate the intakes for this receptor are contained in Tables 4.1.CT and Table 4.4.RME.

5.6.7 Indoor Industrial Worker

Potential redevelopment of the Site could also result in exposure of future indoor industrial workers. These receptors are assumed to be adults exposed during the working day. The following exposure parameters are used to evaluate this receptor:

Parameter and Abbreviation		CTE		RME	
IR	Inhalation Rate (m^3/min)	0.012	USEPA, September 2011	0.012	USEPA, September 2011
EF	Exposure Frequency (days/year)	250	USEPA, December 1989	250	USEPA, December 1989
ED	Exposure Duration (yr)	5	Bur. of Labor Statistics, 2012	25	USEPA, December 1989
ET	Exposure Time (hr/day)	8	Professional Judgment	8	Professional Judgment

Once indoor air concentrations are estimated using the Johnson and Ettinger Model (Environmental Quality Management, Inc., June 2003), the exposures will be estimated using a mean inhalation rate for adults performing light intensity activities (USEPA, September 2011). Full-time indoor employees are assumed to work 250 days/year. Exposure durations are set at 5 years for the CTE (Bureau of Labor Statistics, 2012) and 25 years for the RME (USEPA, December 1989). It is assumed that all workers are exposed for 8 hours/day while at work.

5.7 LEAD EXPOSURE

Exposure to lead in soils will be addressed via a comparison to recommended industrial screening levels. Soil lead intake will be related to blood lead levels in women of child-bearing age (USEPA, January 2003). Default parameters for various inputs such as the biokinetic slope factor will be used.

Intake of lead in soil will be estimated as follows:

$$\text{Absorbed Dose} = PbS \times IR \times EF \times AF / AT$$

Where:

PbS = Lead concentration in soil (mg/kg)
IR = Ingestion rate (mg/day)
EF = Exposure frequency (days/year)
AF = Gastrointestinal absorption of lead (0.12)
ET = Averaging time (days)

Adult blood lead levels will then be evaluated using the default input parameters for baseline blood lead levels, fetal blood lead levels, etc. to determine whether the EPC represents an unacceptable potential risk. The USEPA spreadsheets associated with the Adult Lead Model will be used to estimate the likelihood that fetal blood lead levels will be unacceptable based on potential exposures to lead in soils.

6.0 TOXICITY ASSESSMENT

The toxicity assessment, also known as a dose-response assessment, provides a description of the relationship between a dose, or intake, of a constituent and the anticipated incidence or an adverse health effect. The majority of knowledge about the dose-response relationship is based on data collected from laboratory studies of animals, studies of human occupational exposures, and theories about human responses to environmental doses.

The USEPA has developed dose-response assessment techniques to determine "acceptable" levels of human exposure to environmental constituents. These USEPA-derived values address chronic, and occasionally sub-chronic, non-carcinogenic health effects and potential carcinogenic risks.

6.1 EVALUATION OF POTENTIAL NON-CARCINOGENIC RESPONSE

This section discusses the mechanisms of non-carcinogenic response, the derivation of acceptable dose levels, the manner in which these levels are used in the risk assessment, and some of the limitations of these values. Limitations will be discussed in greater detail in the uncertainty analysis section of the risk assessment.

It is widely accepted that non-carcinogenic effects of chemicals occur only after a threshold dose is achieved. Typically, physiological mechanisms exist that will minimize the adverse effects through pharmacokinetic means such as adsorption, distribution, excretion or metabolism by the human body. Therefore there exists a range of exposures and doses that can be tolerated by a receptor without adverse effects. The threshold dose for a compound is usually estimated from the no observed adverse effect level (NOAEL) or the lowest observed adverse effect level (LOAEL), derived from laboratory animal studies or human exposure data. The NOAEL is the highest dose at which no adverse effects occur, and the LOAEL is the lowest dose at which adverse effects are noticeable.

6.1.1 Non-carcinogenic Toxicity Values

USEPA uses the NOAEL or the LOAEL estimates of threshold doses to establish reference doses (RfDs) and reference concentrations (RfCs) for human exposure. An RfD or RfC is an estimate of a daily exposure level that is unlikely to result in an appreciable risk of adverse effects during a period of exposure. USEPA has developed RfDs and RfCs for chronic (long-term) exposure, as well as sub-chronic exposures for some chemicals.

RfDs, which are used to estimate exposure via ingestion, are expressed in units of dose (mg/kg-day), while RfCs, which are used to estimate exposures via inhalation, are expressed in concentrations (mg/m^3). Both types of toxicity values incorporate uncertainty factors to account for limitations in the quality or quantity of available data. RfDs for dermal exposures are developed through route-to-route extrapolation, as described by the USEPA (July 2004). An oral RfD is converted to an absorbed dose by multiplying the oral RfD by the fractional absorption efficiency factor, as shown in Exhibit 4-1 of that document. A fractional absorption efficiency factor or 1 (100%) is recommended for all the organic COPCs, while several metals have varying recommended rates. For those chemicals not specifically identified with alternate absorption rates, a value of 1 is used.

Non-carcinogenic toxicity data (RfDs) for the oral and dermal routes of exposure are presented in Table 5.1. Both chronic (for long-term exposures) and sub-chronic (short-term exposures less than seven years' duration) are presented, if available. Target organs are presented as well, for eventual segregation of toxicity by health effect in the human health risk assessment, if appropriate. Table 5.2 presents inhalation non-carcinogenic toxicity data in both RfC and RfD format.

6.2 EVALUATION OF POTENTIAL CARCINOGENIC RESPONSES

This section discusses the assumed mechanisms of carcinogenic response, the derivation of carcinogenic toxicity values, the manner in which these values are used in risk assessment, and some of the limitations of these values. Limitations will be discussed in more detail in the uncertainty section of the risk assessment.

USEPA typically has required that potentially carcinogenic constituents be treated as if minimum threshold doses do not exist (USEPA, March 2005). The regulatory dose-response curve used for carcinogens only allows for zero risk at zero dose. Thus for environmental exposures, some level of risk is always assumed upon exposure.

To estimate the theoretical response to environmental doses, various mathematical dose-response models are used. USEPA uses the linearized multi-stage model for low dose extrapolation. This model assumes that the effect of the carcinogenic agent on tumor formation seen at high doses in animal testing is basically the same at low doses (i.e., the slope can be extrapolated in a linear fashion).

USEPA evaluates all available scientific information using a weight-of-evidence approach to determine whether a chemical poses a carcinogenic risk in humans. USEPA groups chemicals according to their potential to result in carcinogenic effects as follows:

- Group A – Known human carcinogen
- Group B – Probable human carcinogen
- Group C – Possible human carcinogen
- Group D – Insufficient data to classify as a human carcinogen
- Group E – Not a human carcinogen

6.2.1 Cancer Toxicity Values

Cancer slope factors (CSFs) and inhalation unit risks (IURs) are the toxicity values used to quantitatively assess potential carcinogenic effects in humans from exposure. CSFs are defined as the plausible upper bound estimate of the increased cancer risk from a lifetime exposure to a given carcinogen. This estimate, usually expressed as the proportion of a population affected per mg/kg-day.

The CSF used to evaluate the oral route of exposure is expressed in units of reciprocal dose, or mg/kg-day)$^{-1}$, while the IUR used to evaluate the inhalation route of exposure is expressed as a reciprocal concentration (mg/m^3)$^{-1}$. CSFs for the dermal route of exposure are developed through route-to-route extrapolation. The oral CSF is converted to an absorbed dermal CSF by dividing the oral CSF by the fractional absorption efficiency factor, as follows:

$$\text{Dermal CSF (mg/kg-day)}^{-1} = \text{Oral CSF (mg/kg-day)}^{-1} \,/\, \text{Oral Absorption Efficiency}$$

Cancer slope factors for the oral and dermal routes of exposure are presented in Table 6.1. Table 6.2 contains inhalation slope factors and unit risks. These values will be used to estimate lifetime incremental cancer risks for each receptor population in the human health risk assessment.

7.0 SUMMARY

This section provides a brief summary of the exposure pathways that will be evaluated in the BHHRA. These scenarios were presented in Table 1. Multiple potential exposure scenarios were eliminated from quantitative assessment for reasons discussed in Section 3 and Table 1.

Under current and future site conditions, exposures of HCTS operators and site visitors to SCCC Site surface soils are evaluated. Their exposures may include dermal contact with soil, as well as incidental ingestion and inhalation of particulates or volatile emissions on an occasional basis.

Under future Site conditions, additional potential receptors will be evaluated. These include construction or utility workers whose work may bring them into contact with soils from the surface to a depth of approximately 10 feet as well as shallow groundwater. Again, dermal contact, incidental ingestion and inhalation scenarios will be evaluated. In addition, should the Site be redeveloped, full-time outdoor and full-time indoor employee scenarios will also be evaluated.

Evaluation of off-site impacts to soil and groundwater outside of the barrier wall is ongoing; however, no complete exposure pathways have been identified under current and future land uses. Evaluation of off-site groundwater will be addressed qualitatively in the risk assessment.

Exposure scenarios were developed based upon reasonably expected future land use (considering the Redevelopment Plan in place (New Jersey Meadowlands Commission, February 2013), the limitations for future groundwater use (CEA, Appendix A), and the ultimate implementation of a deed restriction prohibiting disturbance of the Consolidation Area. Future land use is restricted to industrial-type or support service uses in the Intermodal B zoning restriction.

8.0 REFERENCES

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TABLES

TABLE 1
SELECTION OF EXPOSURE PATHWAYS
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Current	Onsite Groundwater	COPCs in onsite groundwater may enter a ptoable water well and be available for exposure	Tap water from wells installed inside the barrier wall	Onsite Industrial User	Adult	Ingestion Inhalation Dermal Contact	Qual	**Excluded**. Groundwater is not used for potable purposes. Properties supplied with municipal water. Classification Exception Area is planned for the Site and surrounding area to eliminate this exposure.
Current/Future	Onsite Surface Soil	COPCs in onsite surface soil may volatilize or be transferred to airborne particulates and carried offsite, becoming available for exposure	Wind may carry airborne COCs to offsite properties	Offsite Resident	Adult	Inhalation	Qual	**Excluded**. Monitoring data collected for onsite workers during implementation of interim response actions showed no unacceptable levels of either volatile organics or particulates in air monitoring samples collected to date. It is assumed that offsite exposures would be lower. The site surface is either paved, covered with gravel or vegetated.
					Child	Inhalation		
				Offsite Industrial Worker	Adult	Inhalation		
Current/Future	Onsite Surface Soil	COPCs in onsite surface soil are available for exposure	If soil cover is disturbed for any reason, direct exposure may occur to soil and to COCs transferred to airborne particulates	Visitor HCTS Operator	Adult	Ingestion Inhalation Dermal Contact	Quan	**Included**. Occasional visitors to the property may be exposed to surface soils during time spent on site, if the existing soil cover materials are disturbed. HCTS operators onsite daily and perform some duties outdoors. Inhalation not addressed, based on air monitoring data collected during implementation of intgerim response actions
Future	Onsite Surface and Subsurface Soil to Groudnwater	COPCs in soils may be transferred to groundwaters (within the slurry wall)	Exposure may occur during construction activities conducted below the water table	Construction Worker Utility Worker	Adult	Ingestion Inhalation Dermal Contact	Qual	**Included**. Construction workers could come into contact with shallow groundwater. Howver, best management practices in areas of shallow groundwater include dewatering of the excavations, thereby minimizing contact with waters. In addition, the most prevalent COPCs in soil (PAHs, PCBs and dioxins) are not found in the groundwater at significant concentrations, nor are these compounds readily soluble and able to pass through the skin during an intermittent exposure. Shallow groundwater at the Site does not contain high concentrations of organic chemicals outside the limits of the Consolidation Area.
Future	Offsite Surface and Subsurface Soil to Offsite Groundwater	COPCs in soils outside the barrier wall may be transferred to groundwater, enter a potable well, and be available for contact (outside the slurry wally)	Tap water from future potential wells installed outside the barrier wall	Offsite Industrial User	Adult	Ingestion Inhalation Dermal Contact	Qual	**Excluded.** The presence of DNAPL outside the slurry wall could adversely impact groundwater quality, however groundwater is not used and will likely not be used for potable purposes given zoning and land use conditions. However, since the DNAPL exists off-property and soil concentrations exceed NJ Groundwater Protection criteria, and groundwater outside the slurry wall will not be addressed in the Classification Exception Area, this exposure route is evaluated qualitatively to ensure that any groundwater adversely impacted by the Site activities is ultimately addressed in the FFS.
Future	OnsiteSurface Soil	COPCs in surface soil are available for exposure	Exposure may occur to soil and to COCs transferred to airborne particulates	Outdoor Industrial Worker	Adult	Ingestion Inhalation Dermal Contact	Quan	**Included**. Under future site conditions, the property may be redeveloped for industrial use. Outdoor workers such as groundskeepers may be employed.
Future	OnsiteSurface and Subsurface Soil / Groundwater to Air	COPCs in surface and subsurface soil are available for exposure via vapor intrusion into a building	Exposure may occur via vapor intrusion through future building floors	Indoor Industrial Worker	Adult	Ingestion Inhalation Dermal Contact	Quan	**Included**. Under future site conditions, a building could be constructed on the Site. Indoor workers could be affected by volatile emissions from soils and groundwater beneath a structure.
Future	OnsiteSurface and Subsurface Soil to Air	COPCs in surface and subsurface soil are available for exposure in outdoor air	Exposure may occur to soil and to COCs transferred to airborne particulates	Construction Worker Utility Worker	Adult	Ingestion Inhalation Dermal Contact	Quan	**Included**. Construction/utility workers may come into direct contact with surface/subsurface soil during activities that result in soil disturbance.
Future	OnsiteSurface and Subsurface Soil to Surface Water	COPCs in surface and subsurface soil could be transported to surface waters via runoff during construction activities	Exposure may occur via ingestion of fish through bioaccumulation or via dermal contact/ingestion during recreation	Offsite Resident	Adult	Ingestion Dermal Contact	Qual	**Excluded**. Best management practices during construction, installation of cover materials and storm sewers, and prior removal of soft soils from the South Ditch preclude potential exposures to Site-related constituents in surface water or fish.
Future	Groundwater	COPCs in shallow (fill unit) groundwater are available for exposure	Exposure may occur during construction or excavation activities conducted below the water table	Construction Worker Utility Worker	Adult	Ingestion Dermal Contact	Quan	**Included**. Shallow (fill unit) groundwater may be contacted by construction or utility workers during excavation.

TABLE 2.1 - WESTERN AREA SURFACE SOILS (0-2 FEET)
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
SCCC, INC. SITE
KEARNY, NJ

Scenario Timeframe:	Current/Future
Medium:	Surface Soil (0-2 feet bgs)
Exposure Medium:	Surface Soil (0-2 feet bgs)

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)(1)		Maximum Concentration (Qualifier)		Units	Location of Maximum Concentration	Detection Frequency		Range of Detection Limits		Concentration Used for Screening(2)	Background Value (3)	Toxicity Screening Value(4)			Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion (5)
									Detected	Total	Minimum	Maximum			Industrial	Residential	(N/C)				
Onsite	87-61-6	1,2,3-Trichlorobenzene	0.29	J	210		mg/kg	D-19	2	13	0.00072	4.2	210	NA (6)	49	4.9	N	NA	NA	Y	ASL
Surface Soil	120-82-1	1,2,4-Trichlorobenzene	0.00079	J	480		mg/kg	D-19	3	15	0.00085	2.5	480	NA	27	6.2	N	NA	NA	Y	ASL
Particulates	95-50-1	1,2-Dichlorobenzene	0.0012	J	220		mg/kg	D-16	8	18	0.00077	0.47	220	NA	980	190	N	NA	NA	Y	BSL
Volatile Emissions	541-73-1	1,3-Dichlorobenzene*	0.00096	J	200		mg/kg	D-16	9	18	0.00063	0.47	200	NA	980	190	N	NA	NA	Y	BSL
	106-46-7	1,4-Dichlorobenzene	0.0015	J	360		mg/kg	D-16	8	18	0.00061	0.47	360	NA	12	2.4	C	NA	NA	Y	ASL
	71-43-2	Benzene	7.8	J	7.8	J	mg/kg	D-16	1	14	0.00058	2.5	7.8	NA	5.4	1.1	C	NA	NA	Y	ASL
	108-90-7	Chlorobenzene	5.1		45		mg/kg	D-15	3	14	0.00065	1.3	45	NA	140	29	N	NA	NA	Y	BSL
	67-66-3	Chloroform	0.00086	J	0.00086	J	mg/kg	D-20	1	13	0.00056	6.7	0.00086	NA	1.5	0.29	C	NA	NA	N	BSL
	75-09-2	Methylene Chloride	0.11	J	0.93	J	mg/kg	D-15	2	13	0.00074	7.3	0.93	NA	310	36	N	NA	NA	N	BSL
	92-52-4	1,1'-Biphenyl	0.063	J	14		mg/kg	D-19	6	13	0.049	0.11	14	NA	21	5.1	N	NA	NA	Y	BSL
	95-94-3	1,2,4,5-Tetrachlorobenzene*	0.097	J	4.2		mg/kg	D-19	6	13	0.05	0.065	4.2	NA	27	1.8	N	NA	NA	Y	BSL
	120-83-2	2,4-Dichlorophenol	0.047	J	0.34	J	mg/kg	D-16	2	13	0.03	0.12	0.34	NA	180	18	N	NA	NA	N	BSL
	105-67-9	2,4-Dimethylphenol	0.22		0.36		mg/kg	SC-SB-16	2	18	0.073	0.66	0.36	NA	1200	120	N	NA	NA	N	BSL
	91-57-6	2-Methylnaphthalene	0.03	J	0.54		mg/kg	VC-5	9	17	0.047	0.47	0.54	NA	220	23	N	NA	NA	N	BSL
	95-48-7	2-Methylphenol	0.23		0.23		mg/kg	SC-MW-17L	1	17	0.033	1.6	0.23	NA	3100	310	N	NA	NA	N	BSL
	106-44-5	4-Methylphenol	0.32		0.32		mg/kg	SC-SB-16	1	17	0.046	0.43	0.32	NA	6200	610	N	NA	NA	N	BSL
	83-32-9	Acenaphthene	0.039	J	1.1		mg/kg	SC-MW-2L	7	18	0.054	0.47	1.1	NA	3300	340	N	NA	NA	N	BSL
	208-96-8	Acenaphthylene*	0.034	J	0.13		mg/kg	SC-SB-15	3	17	0.034	0.47	0.13	NA	3300	340	N	NA	NA	N	BSL
	98-86-2	Acetophenone	0.12	J	0.29	J	mg/kg	VC-2DUP	2	13	0.039	0.13	0.29	NA	10000	780	N	NA	NA	N	BSL
	120-12-7	Anthracene	0.058		1.1		mg/kg	VC-4	11	18	0.045	0.47	1.1	NA	17000	1700	N	NA	NA	N	BSL
	56-55-3	Benzo(a)anthracene	0.073		1.5		mg/kg	SC-SB-15	16	18	0.47	1.9	1.5	NA	2.1	0.15	C	NA	NA	Y	BSL
	50-32-8	Benzo(a)pyrene	0.03	J	1.6		mg/kg	D-22	15	18	0.12	0.61	1.6	NA	0.21	0.015	C	NA	NA	Y	ASL
	205-99-2	Benzo(b)fluoranthene	0.068		2.2		mg/kg	VC-3	17	18	0.47	0.47	2.2	NA	2.1	0.15	C	NA	NA	Y	ASL
	191-24-2	Benzo(g,h,i)perylene	0.04	J	1.7		mg/kg	D-20	16	18	0.47	1	1.7	NA	-	-	-	NA	NA	N	BSL
	207-08-9	Benzo(k)fluoranthene	0.048		2.2		mg/kg	SC-SB-15	15	17	0.0034	0.47	2.2	NA	21	1.5	C	NA	NA	Y	BSL
	117-81-7	bis(2-Ethylhexyl)phthalate	0.075		120		mg/kg	SC-SB-15	8	18	0.12	0.47	120	NA	120	35	C	NA	NA	Y	BSL
	86-74-8	Carbazole*	0.039		0.36		mg/kg	SC-SB-15	5	17	0.0087	0.47	0.36	NA	-	-	-	NA	NA	N	BSL
	218-01-9	Chrysene	0.11	J	6.4		mg/kg	SC-SB-15	17	18	0.47	0.47	6.4	NA	210	15	C	NA	NA	N	BSL
	53-70-3	Dibenz(a,h)anthracene	0.01	J	0.45		mg/kg	SC-SB-15	14	17	0.12	0.47	0.45	NA	0.21	0.015	C	NA	NA	Y	ASL
	132-64-9	Dibenzofuran	0.12	J	1.2		mg/kg	VC-4	4	17	0.043	0.47	1.2	NA	100	7.8	N	NA	NA	N	BSL
	84-66-2	Diethylphthalate	0.06	J	0.06	J	mg/kg	D-18	1	17	0.044	0.47	0.06	NA	49000	4900	N	NA	NA	N	BSL
	131-11-3	Dimethylphthalate	0.29	J	0.62		mg/kg	SC-SB-16	2	17	0.044	0.16	0.62	NA	-	-	-	NA	NA	N	BSL
	84-72-2	Di-n-Butylphthalate	0.049	J	3.06		mg/kg	SC-MW-2L	4	18	0.046	0.47	3.06	NA	6200	610	N	NA	NA	N	BSL
	117-84-0	Di-n-Octylphthalate	190		190		mg/kg	SC-SB-15	1	17	0.023	0.47	190	NA	620	61	N	NA	NA	Y	BSL
	206-44-0	Fluoranthene	0.069	J	3.14		mg/kg	SC-MW-2L	17	18	0.47	0.47	3.14	NA	2200	230	N	NA	NA	N	BSL
	86-73-7	Fluorene	0.053	J	1.36		mg/kg	SC-MW-2L	5	18	0.039	0.47	1.36	NA	2200	230	N	NA	NA	N	BSL
	118-74-1	Hexachlorobenzene	0.0098	J	0.095		mg/kg	D-19	7	17	0.0051	0.47	0.095	NA	1.1	0.3	C	NA	NA	N	BSL
	87-68-3	Hexachlorobutadiene	0.027	J	0.027	J	mg/kg	D-19	1	17	0.009	0.47	0.027	NA	22	6.1	C	NA	NA	N	BSL
	193-39-5	Indeno(1,2,3-cd)pyrene	0.032	J	1.9		mg/kg	D-22	15	18	0.13	0.9	1.9	NA	2.1	0.15	C	NA	NA	Y	BSL
	91-20-3	Naphthalene	0.04		3.22		mg/kg	SC-MW-2L	16	18	0.043	0.12	3.22	NA	18	3.6	C	NA	NA	N	BSL
	86-30-6	N-Nitrosodiphenylamine	0.15		0.15		mg/kg	SC-MW-17L	1	17	0.036	0.47	0.15	NA	350	99	C	NA	NA	N	BSL
	85-01-8	Phenanthrene*	0.058	J	6.8		mg/kg	VC-4	17	18	0.47	0.47	6.8	NA	17000	1700	N	NA	NA	N	BSL
	108-95-2	Phenol	0.5		0.5		mg/kg	SC-MW-17L	1	17	0.011	1.6	0.5	NA	18000	1800	N	NA	NA	N	BSL
	129-00-0	Pyrene	0.14	J	6.9		mg/kg	SC-SB-15	17	18	0.47	0.47	6.9	NA	1700	170	N	NA	NA	N	BSL
	11097-69-1	PCB-1254	0.034		0.034		mg/kg	TA-SS02	1	16	0.021	0.11	0.034	NA	0.74	0.11	C	NA	NA	N	BSL
	11096-82-5	PCB-1260	0.022		4.2		mg/kg	D-18	5	16	0.021	0.028	4.2	NA	0.74	0.22	C	NA	NA	Y	ASL
	1746-01-6	2,3,7,8-TCDD	9.9174E-06		0.00114525		mg/kg	D-19	13	21	0.000037	0.00067	0.00114525	NA	0.000018	0.0000045	C	NA	NA	Y	ASL
	7429-90-5	Aluminum	2030		29500		mg/kg	VC-3	13	13	NA	NA	29500	NA	99000	7700	N	NA	NA	Y	BSL
	7440-36-0	Antimony	2.9		202		mg/kg	D-22	5	14	1.5	34.3	202	NA	41	3.1	N	NA	NA	Y	ASL
	7440-38-2	Arsenic	3.4		17.7		mg/kg	D-19	7	14	2.1	32.7	17.7	NA	2.4	0.61	C	NA	NA	Y	ASL
	7440-39-3	Barium	19.3	J	4210		mg/kg	D-19	13	13	NA	NA	4210	NA	19000	1500	N	NA	NA	Y	BSL
	7440-41-7	Beryllium	0.38	J	2.5		mg/kg	D-15	8	14	0.21	5	2.5	NA	200	16	N	NA	NA	N	BSL
	7440-43-9	Cadmium	0.93		5.1	J	mg/kg	D-19	4	14	0.15	5.1	5.1	NA	9300	7	N	NA	NA	N	BSL
	7440-70-2	Calcium	938		159000		mg/kg	D-20	13	13	NA	NA	159000	NA	-	-	-	NA	NA	N	BSL
	16065-83-1	Chromium	30.3	J	21400		mg/kg	VC-3	14	14	NA	NA	21400	NA	150000	12000	N	NA	NA	Y	BSL
	7440-48-4	Cobalt	2.2	J	221		mg/kg	VC-5	12	13	2.5	2.5	221	NA	30	2.3	N	NA	NA	Y	ASL

TABLE 2.1 - WESTERN AREA SURFACE SOILS (0-2 FEET)
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
SCCC, INC. SITE
KEARNY, NJ

Scenario Timeframe:	**Current/Future**
Medium:	**Surface Soil (0-2 feet bgs)**
Exposure Medium:	**Surface Soil (0-2 feet bgs)**

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)[1]		Maximum Concentration (Qualifier)		Units	Location of Maximum Concentration	Detection Frequency		Range of Detection Limits		Concentration Used for Screening[2]	Background Value[3]	Toxicity Screening Value[4]			Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion[5]
									Detected	Total	Minimum	Maximum			Industrial	Residential	(N/C)				
	7440-50-8	Copper	18.7	J	278		mg/kg	D-15	11	14	24	67.4	278	NA	4100	310	N	NA	NA	N	BSL
	7439-89-6	Iron	7060		198000		mg/kg	D-19	13	13	NA	NA	198000	NA	72000	5500	N	NA	NA	Y	ASL
	7439-92-1	Lead	18.5		57300		mg/kg	D-22	14	14	NA	NA	57300	NA	800 [7]	400 [8]	N	NA	NA	Y	ASL
	1284-72-6	Magnesium	208	J	89700		mg/kg	VC-5	13	13	NA	NA	89700	NA	-	-	-	NA	NA	N	BSL
	7439-96-5	Manganese	8.2		959		mg/kg	D-16	13	13	NA	NA	959	NA	2300	180	N	NA	NA	Y	**BSL**
	7439-97-6	Mercury	0.024		0.36		mg/kg	VC-2DUP	13	14	0.17	0.17	0.36	NA	4.3	1	N	NA	NA	N	BSL
	7440-02-0	Nickel	7.6	J	881		mg/kg	VC-5	14	14	NA	NA	881	NA	2000	150	N	NA	NA	Y	**BSL**
	7440-09-7	Potassium	177	J	1500	J	mg/kg	D-19	6	13	313	3720	1500	NA	-	-	-	NA	NA	N	BSL
	7782-49-2	Selenium	1.8	J	1.8	J	mg/kg	VC-2DUP	1	13	1.3	45.9	1.8	NA	510	39	N	NA	NA	N	BSL
	7440-22-4	Silver	1.3		1.3		mg/kg	D-22	1	14	0.2	7	1.3	NA	510	39	N	NA	NA	N	BSL
	7647-14-5	Sodium	188	J	1440		mg/kg	D-15	7	13	462	5490	1440	NA	-	-	-	NA	NA	N	BSL
	7440-62-2	Vanadium	12.9		1670		mg/kg	D-16	13	13	NA	NA	1670	NA	510	39	N	NA	NA	Y	ASL
	7440-66-6	Zinc	22.5		45300		mg/kg	D-19	14	14	NA	NA	45300	NA	31000	2300	N	NA	NA	Y	ASL
	18540-29-9	Chromium, hexavalent	0.54		3390		mg/kg	D-16	13	13	NA	NA	3390	NA	5.6	0.29	C	NA	NA	Y	ASL

* = Screened using value for a similar compound
(1) J = Estimated value
(2) Maximum detected concentration used for screening
(3) No background soil samples collected.
(4) USEPA, November 2013. Regional Screening Level (RSL) Summary Table (TR = 1E-6; HQ = 0.1). Lower of cancer/noncancer industrial soil concentration used for screening.
(5) ASL = Above screening level — ASL indicates that screening concentration exceeds industrial criterion. COPC will be addressed in risk calculations.
BSL = Below screening level — Bolding indicates that screening concentration exceeds residential criterion, but is less than industrial criterion. COPC will not be addressed in risk calculations.
(6) NA = Not applicable
(7) http://www.epa.gov/superfund/lead/almfaq.htm
(8) USEPA, August 1994. OSWER Directive 9355.4-12.

TABLE 2.2 - EASTERN AREA SURFACE SOILS (0 TO 2 FEET)
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
SCCC, INC. SITE
KEARNY, NJ

Scenario Timeframe:	**Current/Future**
Medium:	**Surface Soil (0-2 feet bgs)**
Exposure Medium:	**Surface Soil (0-2 feet bgs)**

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)[1]		Maximum Concentration (Qualifier)		Units	Location of Maximum Concentration	Detection Frequency		Range of Detection Limits		Concentration Used for Screening[2]	Background Value[3]	Toxicity Screening Value[4]			Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion[5]
									Detected	Total	Minimum	Maximum			Industrial	Residential	(N/C)				
Onsite	120-82-1	1,2,4-Trichlorobenzene	6.36		200000		mg/Kg	TSS-9D	11	11	NA[6]	NA	200000	NA	27	6.2	N	NA	NA	Y	ASL
Surface Soil	156-59-2	1,2-Dichloroethene	0.0205		0.0765		mg/kg	TSS-7	2	11	0.0024	10	0.0765	NA	920	70	N	NA	NA	N	BSL
Particulates	95-50-1	1,2-Dichlorobenzene	3.78		6470		mg/Kg	TSS-9D	10	11	2.9	2.9	6470	NA	980	190	N	NA	NA	Y	ASL
Volatile Emission	541-73-1	1,3-Dichlorobenzene	6.4		1550		mg/Kg	TSS-9D	10	11	2.9	2.9	1550	NA	980	190	N	NA	NA	Y	ASL
	106-46-7	1,4-Dichlorobenzene	15		4840		mg/kg	TSS-2	9	11	6.6	7.4	4840	NA	12	2.4	C	NA	NA	Y	ASL
	108-90-7	Chlorobenzene	0.0891		99.6		mg/kg	TSS-1	6	11	0.0091	8.7	99.6	NA	140	29	N	NA	NA	Y	**BSL**
	75-09-2	Methylene Chloride	0.00657		7.02		mg/kg	TSS-9	6	11	0.0042	18	7.02	NA	310	36	N	NA	NA	N	BSL
	127-18-4	Tetrachloroethene	0.00991		2.31		mg/kg	TSS-5	3	11	0.0062	26	2.31	NA	41	8.6	N	NA	NA	N	BSL
	79-01-6	Trichloroethene	0.0292		0.866		mg/kg	TSS-5	2	11	0.0029	12	0.866	NA	2	0.44	N	NA	NA	Y	**BSL**
	92-52-4	1,1'-Biphenyl	0.058	J	0.4	J	mg/kg	SC-SS-02	4	7	0.021	0.097	0.4	NA	21	5.1	N	NA	NA	N	BSL
	105-67-9	2,4-Dimethylphenol	0.053	J	0.77	J	mg/kg	SC-SS-02	3	7	0.019	0.089	0.77	NA	1200	120	N	NA	NA	N	BSL
	106-44-5	4-Methylphenol	0.057	J	0.34		mg/kg	SC-SS-04	2	7	0.02	0.19	0.34	NA	6200	610	N	NA	NA	N	BSL
	83-32-9	Acenaphthene	0.045	J	219		mg/kg	TSS-2	10	18	0.064	3.5	219	NA	3300	340	N	NA	NA	N	BSL
	208-96-8	Acenaphthylene*	0.043	J	24.1		mg/kg	TSS-1	8	18	5.1	9	24.1	NA	3300	340	N	NA	NA	N	BSL
	120-12-7	Anthracene	0.2	J	46.2		mg/kg	TSS-1	12	18	2.9	4.9	46.2	NA	17000	1700	N	NA	NA	N	BSL
	56-55-3	Benzo(a)anthracene	0.17		22		mg/kg	SC-SS-04	6	18	0.063	49	22	NA	2.1	0.15	C	NA	NA	Y	ASL
	50-32-8	Benzo(a)pyrene	0.17		37		mg/kg	SC-SS-04	12	18	3.7	16	37	NA	0.21	0.015	C	NA	NA	Y	ASL
	205-99-2	Benzo(b)fluoranthene	0.42		65.8		mg/kg	TSS-3	13	18	6.9	30	65.8	NA	2.1	0.15	C	NA	NA	Y	ASL
	191-24-2	Benzo(g,h,i)perylene	0.21		34		mg/kg	SC-SS-04	13	18	5.9	26	34	NA	--	--	--	NA	NA	N	BSL
	117-81-7	bis(2-Ethylhexyl)phthalate	0.26	J	44.5		mg/kg	TSS-7	6	18	0.068	63	44.5	NA	120	35	C	NA	NA	Y	**BSL**
	86-74-8	Carbazole	0.084	J	1.6		mg/kg	SC-SS-04	7	7	NA	NA	1.6	NA	--	--	--	NA	NA	N	BSL
	218-01-9	Chrysene	0.16		41.9		mg/kg	TSS-1	16	18	0.069	3.8	41.9	NA	210	15	C	NA	NA	Y	**BSL**
	53-70-3	Dibenz(a,h)anthracene	0.029	J	8.8		mg/kg	SC-SS-04	8	18	3.6	16	8.8	NA	0.21	0.015	C	NA	NA	Y	ASL
	132-64-9	Dibenzofuran	0.064	J	1.2		mg/kg	SC-SS-02	7	7	NA	NA	1.2	NA	100	7.8	N	NA	NA	N	BSL
	84-66-2	Diethylphthalate	0.077	J	0.077	J	mg/kg	SC-SS-07	1	7	0.026	0.24	0.077	NA	49000	4900	N	NA	NA	N	BSL
	206-44-0	Fluoranthene	0.36		121		mg/kg	TSS-1	16	18	3.3	3.7	121	NA	2200	230	N	NA	NA	N	BSL
	86-73-7	Fluorene	0.041	J	213		mg/kg	TSS-1	9	18	0.06	4.9	213	NA	2200	230	N	NA	NA	N	BSL
	118-74-1	Hexachlorobenzene	0.95		359		mg/kg	TSS-5	11	18	0.017	3.1	359	NA	1.1	0.3	C	NA	NA	Y	ASL
	87-68-3	Hexachlorobutadiene	8.52		8.52		mg/kg	TSS-2	1	18	0.019	5.6	8.52	NA	22	6.1	C	NA	NA	Y	**BSL**
	193-39-5	Indeno(1,2,3-cd)pyrene	0.31		35.9		mg/kg	TSS-3	13	18	5.4	23	35.9	NA	2.1	0.15	C	NA	NA	Y	ASL
	91-20-3	Naphthalene	0.11		448		mg/kg	TSS-10	14	17	2.4	4.1	448	NA	18	3.6	C	NA	NA	Y	ASL
	85-01-8	Phenanthrene*	0.25		428		mg/kg	TSS-1	14	18	8.1	9.3	428	NA	17000	1700	N	NA	NA	N	BSL
	129-00-0	Pyrene	0.29		70.5		mg/kg	TSS-1	16	18	2.9	3.2	70.5	NA	1700	170	N	NA	NA	N	BSL
	12672-29-6	PCB-1248	0.1		2.5		mg/kg	SC-SS-04	5	7	0.0019	0.0019	2.5	NA	0.74	0.22	C	NA	NA	Y	ASL
	11097-69-1	PCB-1254	0.042	PG	1		mg/kg	SC-SS-04	7	7	NA	NA	1	NA	0.74	0.11	C	NA	NA	Y	ASL
	11100-14-4	PCB-1268*	0.041	PG	0.46		mg/kg	SC-SS-06	4	7	0.0026	0.0029	0.46	NA	0.74	0.22	C	NA	NA	Y	**BSL**
	1746-01-6	2,3,7,8-TCDD	0.00052		0.0595		mg/kg	16	2	12	0.00013	0.0014	0.0595	NA	0.000018	0.0000045	C	NA	NA	Y	ASL

* = Screened using value for a similar compound
(1) J = Estimated value
PG = Percent difference between columns >25%
(2) Maximum detected concentration used for screening
(3) No background soil samples collected.
(4) USEPA, November 2013. Regional Screening Level (RSL) Summary Table (TR = 1E-6; HQ = 0.1). Lower of cancer/noncancer industrial soil concentration used for screening.
(5) ASL = Above screening level — ASL indicates that screening concentration exceeds industrial criterion. COPC will be addressed in risk calculations.
BSL = Below screening level — Bolding indicates that screening concentration exceeds residential criterion, but is less than industrial criterion. COPC will not be addressed in risk calculations.
(6) NA = Not applicable

TABLE 2.3 - WESTERN AREA SUBSURFACE SOILS (0-10 FEET)
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
SCCC, INC. SITE
KEARNY, NJ

Scenario Timeframe:	Future
Medium:	Subsurface Soil (0-10 feet bgs)
Exposure Medium:	Subsurface Soil (0-10 feet bgs)

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)[1]		Maximum Concentration (Qualifier)		Units	Location of Maximum Concentration	Detection Frequency		Range of Detection Limits		Concentration Used for Screening[2]	Background Value[3]	Toxicity Screening Value[4]			Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion[5]
									Detected	Total	Minimum	Maximum			Industrial	Residential	(N/C)				
Onsite	71-55-6	1,1,1-Trichloroethane	0.36		0.5		mg/kg	SB-4A	2	61	0.00017	63	0.5	NA[6]	3800	870	N	NA	NA	N	BSL
Subsurface Soil	87-61-6	1,2,3-Trichlorobenzene	0.29	J	210		mg/kg	D-19	2	15	0.00072	38	210	NA	49	4.9	N	NA	NA	Y	ASL
Particulates	120-82-1	1,2,4-Trichlorobenzene	0.00079	J	1300		mg/kg	BW-18A	7	25	0.00085	23	1300	NA	27	6.2	N	NA	NA	Y	ASL
Volatile Emissions	95-50-1	1,2-Dichlorobenzene	0.0012	J	3300		mg/kg	D-16	13	25	0.00077	0.47	3300	NA	980	190	N	NA	NA	Y	ASL
	78-87-5	1,2-Dichloropropane	0.00094	J	1.14		mg/Kg	SC-MW-2L	4	61	0.00028	78	1.14	NA	4.7	0.94	C	NA	NA	Y	BSL
	541-73-1	1,3-Dichlorobenzene*	0.00096	J	3300		mg/kg	D-16	17	29	0.00063	0.47	3300	NA	980	190	N	NA	NA	Y	ASL
	106-46-7	1,4-Dichlorobenzene	0.0015	J	5200		mg/kg	D-16	16	29	0.00061	0.47	5200	NA	12	2.4	C	NA	NA	Y	ASL
	78-93-3	2-Butanone	0.0029	J	0.56		mg/kg	SB-4A	10	60	0.00053	66	0.56	NA	20000	2800	N	NA	NA	N	BSL
	67-64-1	Acetone	0.0066	J	0.35		mg/kg	SB-4A	20	60	0.0042	300	0.35	NA	63000	6100	N	NA	NA	N	BSL
	71-43-2	Benzene	0.00071	J	110	J	mg/kg	D-16	29	61	0.00058	19	110	NA	5.4	1.1	C	NA	NA	Y	ASL
	75-15-0	Carbon Disulfide	0.00063	J	0.0059		mg/kg	ST-5-S	3	57	0.00041	65	0.0059	NA	370	82	N	NA	NA	N	BSL
	56-23-5	Carbon Tetrachloride	0.089		0.089		mg/kg	SB-4A	1	61	0.00009	66	0.089	NA	3	0.61	C	NA	NA	N	BSL
	108-90-7	Chlorobenzene	0.0012		630		mg/kg	ST-4W	43	61	0.00043	1.3	630	NA	140	29	N	NA	NA	Y	ASL
	67-66-3	Chloroform	0.00086	J	0.00086	J	mg/kg	D-20	1	57	0.00021	61	0.00086	NA	1.5	0.29	C	NA	NA	N	BSL
	74-87-3	Chloromethane	0.18		0.18		mg/kg	SB-4A	1	61	0.00056	85	0.18	NA	50	12	N	NA	NA	N	BSL
	156-59-2	cis-1,2-Dichloroethene	0.00058	J	0.0021		mg/kg	ST-8S	2	57	0.00021	40	0.0021	NA	200	16	N	NA	NA	N	BSL
	100-41-4	Ethylbenzene	0.00048	J	450		mg/kg	D-16	14	57	0.00017	21	450	NA	27	5.4	C	NA	NA	Y	ASL
	108-38-3 (m); 106-42-3 (p)	m,p-Xylenes	1700		1700		mg/kg	D-16	1	15	0.0013	16	1700	NA	250	59	N	NA	NA	Y	ASL
	108-87-2	Methylcyclohexane	48	J	48	J	mg/kg	D-16	1	19	0.00062	20	48	NA	--	--	--	NA	NA	N	BSL
	75-09-2	Methylene Chloride	0.0015	J	9.7	J	mg/kg	BW-18A	10	57	0.00042	66	9.7	NA	310	36	N	NA	NA	N	BSL
	95-47-6	o-Xylene	600		600		mg/kg	D-16	1	15	0.00067	9	600	NA	300	69	N	NA	NA	Y	ASL
	100-42-5	Styrene	0.12		4		mg/kg	ST-7N	3	60	0.00031	39	4	NA	3600	630	N	NA	NA	N	BSL
	127-18-4	Tetrachloroethene	0.003		7.9		mg/kg	ST-1B-E	6	61	0.00029	50	7.9	NA	41	8.6	N	NA	NA	N	BSL
	108-88-3	Toluene	0.00045	J	420		mg/kg	D-16	18	61	0.00027	14	420	NA	4500	500	N	NA	NA	N	BSL
	156-60-5	trans-1,2-Dichloroethene	0.00056	J	0.00056	J	mg/kg	ST-8S	1	57	0.00025	46	0.00056	NA	69	15	N	NA	NA	N	BSL
	75-01-4	Vinyl Chloride	0.00096	J	0.00096	J	mg/kg	ST-8S	1	57	0.00021	79	0.00096	NA	1.7	0.06	C	NA	NA	N	BSL
		Xylene (total)	0.0019	J	110		mg/Kg	ST-7N	14	45	0.0007	64	110	NA	270	63	N	NA	NA	Y	BSL
	92-52-4	1,1'-Biphenyl	0.063	J	22		mg/kg	D-16	11	19	0.049	1.4	22	NA	21	5.1	N	NA	NA	Y	ASL
	95-94-3	1,2,4,5-Tetrachlorobenzene*	0.097	J	210		mg/kg	D-21	8	15	0.05	0.065	210	NA	27	1.8	N	NA	NA	Y	ASL
	120-83-2	2,4-Dichlorophenol	0.047	J	4.3		mg/kg	D-21	5	19	0.012	3.1	4.3	NA	180	18	N	NA	NA	N	BSL
	105-67-9	2,4-Dimethylphenol	0.22		0.36		mg/kg	SC-SC-16	2	29	0.017	13	0.36	NA	1200	120	N	NA	NA	N	BSL
	91-57-6	2-Methylnaphthalene	0.03	J	140		mg/kg	D-16	14	28	0.047	12	140	NA	220	23	N	NA	NA	Y	BSL
	95-48-7	2-Methylphenol	0.23		0.23		mg/kg	SC-MW-17L	1	25	0.025	3.6	0.23	NA	3100	310	N	NA	NA	N	BSL
	106-44-5	4-Methylphenol	0.11	J	0.32		mg/kg	SC-SB-16	2	25	0.025	4.2	0.32	NA	6200	610	N	NA	NA	N	BSL
	83-32-9	Acenaphthene	0.039	J	25		mg/kg	SB-2A	12	29	0.054	12	25	NA	3300	340	N	NA	NA	N	BSL
	208-96-8	Acenaphthylene*	0.034	J	12	J	mg/kg	D-16	7	25	0.034	0.47	12	NA	3300	340	N	NA	NA	N	BSL
	98-86-2	Acetophenone	0.12	J	0.29	J	mg/kg	VC-2DUP	2	19	0.025	3.2	0.29	NA	10000	780	N	NA	NA	N	BSL
	120-12-7	Anthracene	0.058		90		mg/kg	SB-2A	17	29	0.045	12	90	NA	17000	1700	N	NA	NA	N	BSL
	56-55-3	Benzo(a)anthracene	0.073		87		mg/kg	SB-2A	23	29	0.14	12	87	NA	2.1	0.15	C	NA	NA	Y	ASL
	50-32-8	Benzo(a)pyrene	0.03	J	82		mg/kg	SB-2A	22	29	0.12	12	82	NA	0.21	0.015	C	NA	NA	Y	ASL
	205-99-2	Benzo(b)fluoranthene	0.041		58		mg/kg	SB-2A	25	29	0.47	12	58	NA	2.1	0.15	C	NA	NA	Y	ASL
	191-24-2	Benzo(g,h,i)perylene	0.04	J	53		mg/kg	SB-2A	22	29	0.14	12	53	NA	--	--	--	NA	NA	N	BSL
	207-08-9	Benzo(k)fluoranthene	0.048		11		mg/kg	D-16	16	25	0.0034	0.62	11	NA	21	1.5	C	NA	NA	Y	BSL
	117-81-7	bis(2-Ethylhexyl)phthalate	0.075		120		mg/kg	SC-SB-15	10	29	0.031	13	120	NA	120	35	C	NA	NA	Y	BSL
	86-74-8	Carbazole	0.039		10		mg/kg	SB-2A	9	28	0.0087	12	10	NA	--	--	--	NA	NA	N	BSL
	218-01-9	Chrysene	0.11	J	79		mg/kg	SB-2A	24	29	0.14	12	79	NA	210	15	C	NA	NA	Y	BSL
	53-70-3	Dibenz(a,h)anthracene	0.01	J	4.9		mg/kg	D-16	18	25	0.12	0.47	4.9	NA	0.21	0.015	C	NA	NA	Y	ASL
	132-64-9	Dibenzofuran	0.12	J	15		mg/kg	SB-2A	9	28	0.043	12	15	NA	100	7.8	N	NA	NA	Y	BSL
	84-66-2	Diethylphthalate	0.06	J	0.084	J	mg/kg	BW-18A	2	25	0.036	2.5	0.084	NA	49000	4900	N	NA	NA	N	BSL
	131-11-3	Dimethylphthalate	0.29	J	0.62		mg/kg	SC-SB-16	2	25	0.023	2.5	0.62	NA	--	--	--	NA	NA	N	BSL
	84-72-2	Di-n-Butylphthalate	0.049	J	3.06		mg/kg	SC-MW-2L	4	29	0.046	13	3.06	NA	6200	610	N	NA	NA	N	BSL
	117-84-0	Di-n-Octylphthalate	190		190		mg/kg	SC-SB-15	1	25	0.023	1.6	190	NA	620	61	N	NA	NA	Y	BSL
	206-44-0	Fluoranthene	0.05		200		mg/kg	SB-2A	26	29	0.47	12	200	NA	2200	230	N	NA	NA	N	BSL
	86-73-7	Fluorene	0.053	J	65		mg/kg	D-16	10	29	0.039	12	65	NA	2200	230	N	NA	NA	N	BSL

TABLE 2.3 - WESTERN AREA SUBSURFACE SOILS (0-10 FEET)
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
SCCC, INC. SITE
KEARNY, NJ

Scenario Timeframe:	Future
Medium:	Subsurface Soil (0-10 feet bgs)
Exposure Medium:	Subsurface Soil (0-10 feet bgs)

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)[1]		Maximum Concentration (Qualifier)		Units	Location of Maximum Concentration	Detection Frequency		Range of Detection Limits		Concentration Used for Screening [2]	Background Value [3]	Toxicity Screening Value [4]			Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion [5]
									Detected	Total	Minimum	Maximum			Industrial	Residential	(N/C)				
	118-74-1	Hexachlorobenzene	0.0098	J	0.095		mg/kg	D-19	7	25	0.0051	0.47	0.095	NA	1.1	0.3	C	NA	NA	N	BSL
	87-68-3	Hexachlorobutadiene	0.027	J	0.027	J	mg/kg	D-19	1	25	0.009	0.52	0.027	NA	22	6.1	C	NA	NA	N	BSL
	193-39-5	Indeno(1,2,3-cd)pyrene	0.032	J	54		mg/kg	SB-2A	21	29	0.13	12	54	NA	2.1	0.15	C	NA	NA	Y	ASL
	78-59-1	Isophorone	0.36	J	0.36	J	mg/kg	BW-15	1	19	0.023	2.6	0.36	NA	1800	510	C	NA	NA	N	BSL
	91-20-3	Naphthalene	0.04		110		mg/kg	D-16	22	29	0.043	12	110	NA	18	3.6	C	NA	NA	Y	ASL
	86-30-6	N-Nitrosodiphenylamine	0.15		0.15		mg/kg	SC-MW-17L	1	25	0.022	2.1	0.15	NA	350	99	C	NA	NA	N	BSL
	85-01-8	Phenanthrene*	0.058	J	250		mg/kg	D-16	25	29	0.14	12	250	NA	17000	1700	N	NA	NA	N	BSL
	108-95-2	Phenol	0.5		0.5		mg/kg	SC-MW-17L	1	25	0.011	2.8	0.5	NA	18000	1800	N	NA	NA	N	BSL
	129-00-0	Pyrene	0.044		190		mg/kg	SB-2A	26	29	0.47	12	190	NA	1700	170	N	NA	NA	Y	**BSL**
	11097-69-1	PCB-1254	0.034		0.034		mg/kg	TA-SS01	1	25	0.0029	1.3	0.034	NA	0.74	0.11	C	NA	NA	N	BSL
	11096-82-5	PCB-1260	0.022		4.2		mg/kg	D-18	6	25	0.0029	1.3	4.2	NA	0.74	0.22	C	NA	NA	Y	ASL
	1746-01-6	2,3,7,8-TCDD	2.0107E-06		4.150E-03		mg/kg	D-16	19	27	0.000037	0.00067	0.004150167	NA	0.000018	0.0000045	C	NA	NA	Y	ASL
	7429-90-5	Aluminum	1600	J	29500		mg/kg	VC-3	18	18	NA	NA	29500	NA	99000	7700	N	NA	NA	Y	**BSL**
	7440-36-0	Antimony	2.9		202		mg/kg	D-22	9	22	0.23	34.3	202	NA	41	3.1	N	NA	NA	Y	ASL
	7440-38-2	Arsenic	2.53		54.9		mg/kg	BW-15	15	22	2.1	32.7	54.9	NA	2.4	0.61	C	NA	NA	Y	ASL
	7440-39-3	Barium	19.3	J	4210		mg/kg	D-19	18	18	0	0	4210	NA	19000	1500	N	NA	NA	Y	**BSL**
	7440-41-7	Beryllium	0.38	J	2.5		mg/kg	D-15	12	22	0.14	5	2.5	NA	200	16	N	NA	NA	N	BSL
	7440-43-9	Cadmium	0.6	B	5.1	J	mg/kg	D-19	7	22	0.058	5.1	5.1	NA	9300	7	N	NA	NA	N	BSL
	7440-70-2	Calcium	938		159000		mg/kg	D-20	18	18	NA	NA	159000	NA	--	--	--	NA	NA	N	BSL
	16065-83-1	Chromium	11		37000		mg/kg	ST-6N	60	60	NA	NA	37000	NA	150000	12000	N	NA	NA	Y	**BSL**
	7440-48-4	Cobalt	1.2	B	221		mg/kg	VC-5	17	18	2.5	2.5	221	NA	30	2.3	N	NA	NA	Y	ASL
	7440-50-8	Copper	11.9		335		mg/kg	SB-4A	19	22	24	67.4	335	NA	4100	310	N	NA	NA	Y	**BSL**
	7439-89-6	Iron	7060		198000		mg/kg	D-19	18	18	NA	NA	198000	NA	72000	5500	N	NA	NA	Y	ASL
	7439-92-1	Lead	18.5		57300		mg/kg	D-22	22	22	NA	NA	57300	NA	800 [7]	400 [8]	N	NA	NA	Y	ASL
	1284-72-6	Magnesium	208	J	89700		mg/kg	VC-5	18	18	NA	NA	89700	NA	--	--	--	NA	NA	N	BSL
	7439-96-5	Manganese	8.2		959		mg/kg	D-16	18	18	NA	NA	959	NA	2300	180	N	NA	NA	Y	**BSL**
	7439-97-6	Mercury	0.024		0.91		mg/kg	BW-15	19	22	0.17	0.32	0.91	NA	4.3	1	N	NA	NA	N	BSL
	7440-02-0	Nickel	4.6	B	881		mg/kg	VC-5	22	22	NA	NA	881	NA	2000	150	N	NA	NA	Y	**BSL**
	7440-09-7	Potassium	177	J	1500	J	mg/kg	D-19	11	18	313	3720	1500	NA	--	--	--	NA	NA	N	BSL
	7782-49-2	Selenium	0.69		5.1	J	mg/kg	D-21	6	21	1.3	45.9	5.1	NA	510	39	N	NA	NA	N	BSL
	7440-22-4	Silver	0.17	BJ	1.3		mg/kg	D-22	4	22	0.17	7	1.3	NA	510	39	N	NA	NA	N	BSL
	7647-14-5	Sodium	153	B	1860		mg/kg	BW-15	12	18	462	5490	1860	NA	--	--	--	NA	NA	N	BSL
	7440-28-0	Thallium	1.7		5		mg/kg	BW-15	3	21	1.1	39.3	5	NA	1	0.078	N	NA	NA	Y	ASL
	7440-62-2	Vanadium	10.3	B	1670		mg/kg	D-16	18	18	NA	NA	1670	NA	510	39	N	NA	NA	Y	ASL
	7440-66-6	Zinc	22.5		45300		mg/kg	D-19	22	22	NA	NA	45300	NA	31000	2300	N	NA	NA	Y	ASL
	18540-29-9	Chromium, hexavalent	0.54		11000		mg/kg	ST-7-W	37	56	0.17	2.8	11000	NA	5.6	0.29	C	NA	NA	Y	ASL

* = Screened using value for a similar compound
(1) J = Estimated value
B = Reported value is between Contract Required Detection Limit and Instrument Detection Limit
(2) Maximum detected concentration used for screening
(3) No background soil samples collected.
(4) USEPA, November 2013. Regional Screening Level (RSL) Summary Table (TR = 1E-6; HQ = 0.1). Lower of cancer/noncancer industrial soil concentration used for screening.
(5) ASL = Above screening level — ASL indicates that screening concentration exceeds industrial criterion. COPC will be addressed in risk calculations.
BSL = Below screening level — Bolding indicates that screening concentration exceeds residential criterion, but is less than industrial criterion. COPC will not be addressed in risk calculations.
(6) NA = Not applicable
(7) http://www.epa.gov/superfund/lead/almfaq.htm
(8) USEPA, August 1994. OSWER Directive 9355.4-12.

TABLE 2.4 - EASTERN AREA SUBSURFACE SOILS (0 TO 10 FEET)
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
SCCC, INC. SITE
KEARNY, NJ

Scenario Timeframe:	Future
Medium:	Subsurface Soil (0-10 feet bgs)
Exposure Medium:	Subsurface Soil (0-10 feet bgs)

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)[1]		Maximum Concentration (Qualifier)		Units	Location of Maximum Concentration	Detection Frequency		Range of Detection Limits		Concentration Used for Screening [2]	Background Value [3]	Toxicity Screening Value [4]			Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion [5]
									Detected	Total	Minimum	Maximum			Industrial	Residential	(N/C)				
Onsite Subsurface Soil Particulates Volatile Emissions	120-82-1	1,2,4-Trichlorobenzene	0.007	J	200000	J	mg/kg	TSS-9D	13	16	0.001	5.3	200000	NA [6]	27	6.2	N	NA	NA	Y	ASL
	156-59-2	1,2-Dichloroethene	0.0205		0.0765		mg/kg	TSS-3	11	22	0.0024	10	0.0765	NA	920	70	N	NA	NA	N	BSL
	95-50-1	1,2-Dichlorobenzene	3.78		6470		mg/Kg	TSS-9D	10	11	2.9	2.9	6470	NA	980	190	N	NA	NA	Y	ASL
	541-73-1	1,3-Dichlorobenzene*	6.4		1550		mg/Kg	TSS-9D	10	11	2.9	2.9	1550	NA	980	190	N	NA	NA	Y	ASL
	106-46-7	1,4-Dichlorobenzene	0.55		4840		mg/kg	BW-04	10	16	0.00076	7.4	4840	NA	12	2.4	C	NA	NA	Y	ASL
	71-43-2	Benzene	0.0015	J	0.0035	J	mg/kg	BW-04	2	16	0.0031	27	0.0035	NA	5.4	1.1	C	NA	NA	N	BSL
	108-90-7	Chlorobenzene	0.0891		99.6		mg/kg	TSS-1	8	16	0.0009	8.7	99.6	NA	140	29	N	NA	NA	Y	BSL
	75-09-2	Methylene Chloride	0.00657		7.02		mg/kg	TSS-9	6	16	0.0008	18	7.02	NA	310	36	N	NA	NA	N	BSL
	127-18-4	Tetrachloroethene	0.00991		2.31		mg/kg	TSS-5	3	16	0.00081	26	2.31	NA	41	8.6	N	NA	NA	N	BSL
	79-01-6	Trichloroethene	0.0292		0.866		mg/kg	TSS-5	2	16	0.00078	12	0.866	NA	2	0.44	N	NA	NA	Y	BSL
	92-52-4	1,1'-Biphenyl	0.044	J	4.6	J	mg/kg	BW-3	7	12	0.021	0.097	4.6	NA	21	5.1	N	NA	NA	N	BSL
	105-67-9	2,4-Dimethylphenol	0.053	J	0.77	J	mg/kg	SC-SS-02	3	12	0.018	2.2	0.77	NA	1200	120	N	NA	NA	N	BSL
	91-57-6	2-Methylnaphthalene	0.047	J	35	J	mg/kg	BW-03	10	12	0.025	0.036	35	NA	220	23	N	NA	NA	Y	BSL
	95-48-7	2-Methylphenol	0.031	J	0.031	J	mg/kg	BW-02	1	12	0.017	3.1	0.031	NA	3100	310	N	NA	NA	N	BSL
	106-44-5	4-Methylphenol	0.057	J	8.8	J	mg/kg	BW-03	4	12	0.02	0.19	8.8	NA	6200	610	N	NA	NA	N	BSL
	83-32-9	Acenaphthene	0.045	J	219		mg/kg	TSS-2	13	23	0.023	3.5	219	NA	3300	340	N	NA	NA	N	BSL
	208-96-8	Acenaphthylene*	0.043	J	24.1		mg/kg	TSS-1	10	23	0.026	9	24.1	NA	3300	340	N	NA	NA	N	BSL
	120-12-7	Anthracene	0.046	J	46.2		mg/kg	TSS-1	16	23	0.037	4.9	46.2	NA	17000	1700	N	NA	NA	N	BSL
	56-55-3	Benzo(a)anthracene	0.14	J	22		mg/kg	SC-SS-04	9	23	0.026	49	22	NA	2.1	0.15	C	NA	NA	Y	ASL
	50-32-8	Benzo(a)pyrene	0.14	J	37		mg/kg	SC-SS-04	16	23	0.02	16	37	NA	0.21	0.015	C	NA	NA	Y	ASL
	205-99-2	Benzo(b)fluoranthene	0.22	J	65.8		mg/kg	TSS-3	17	23	0.025	30	65.8	NA	2.1	0.15	C	NA	NA	Y	ASL
	191-24-2	Benzo(g,h,i)perylene	0.11	J	34		mg/kg	SC-SS-04	16	23	0.022	26	34	NA	--	--	--	NA	NA	N	BSL
	117-81-7	bis(2-Ethylhexyl)phthalate	0.16	J	44.5		mg/kg	TSS-7	7	23	0.032	63	44.5	NA	120	34	C	NA	NA	Y	BSL
	86-74-8	Carbazole	0.025	J	7	J	mg/kg	BW-03	11	12	0.027	0.027	7	NA	--	--	--	NA	NA	N	BSL
	218-01-9	Chrysene	0.14	J	41.9		mg/kg	TSS-1	19	23	0.026	3.8	41.9	NA	210	15	C	NA	NA	Y	BSL
	53-70-3	Dibenz(a,h)anthracene	0.029	J	8.8		mg/kg	SC-SS-04	10	23	0.027	16	8.8	NA	0.21	0.015	C	NA	NA	Y	ASL
	132-64-9	Dibenzofuran	0.064	J	14	J	mg/kg	BW-03	10	12	0.025	0.036	14	NA	100	7.8	N	NA	NA	Y	BSL
	84-66-2	Diethylphthalate	0.077	J	0.077	J	mg/kg	SC-SS-07	1	12	0.026	4.5	0.077	NA	49000	4900	N	NA	NA	N	BSL
	206-44-0	Fluoranthene	0.36		121		mg/kg	TSS-1	20	23	0.042	3.7	121	NA	2200	230	N	NA	NA	N	BSL
	86-73-7	Fluorene	0.041	J	213		mg/kg	TSS-1	12	23	0.022	4.9	213	NA	2200	230	N	NA	NA	N	BSL
	118-74-1	Hexachlorobenzene	0.95		359		mg/kg	TSS-5	11	23	0.017	3.1	359	NA	1.1	0.3	C	NA	NA	Y	ASL
	87-68-3	Hexachlorobutadiene	8.52		8.52		mg/kg	TSS-2	1	23	0.019	5.6	8.52	NA	22	6.1	C	NA	NA	Y	BSL
	193-39-5	Indeno(1,2,3-cd)pyrene	0.074	J	35.9		mg/kg	TSS-3	16	23	0.023	23	35.9	NA	2.1	0.15	C	NA	NA	Y	ASL
	91-20-3	Naphthalene	0.11		2000		mg/kg	BW-03	19	22	2.4	4.1	2000	NA	18	3.6	C	NA	NA	Y	ASL
	85-01-8	Phenanthrene	0.25		428		mg/kg	TSS-1	18	23	0.031	9.3	428	NA	17000	1700	N	NA	NA	N	BSL
	129-00-0	Pyrene	0.29		70.5		mg/kg	TSS-1	19	23	0.04	3.2	70.5	NA	1700	170	N	NA	NA	N	BSL
	12672-29-6	PCB-1248	0.052		2.5		mg/kg	SC-SS-04	6	12	0.0019	0.0031	2.5	NA	0.74	0.22	C	NA	NA	Y	ASL
	11097-69-1	PCB-1254	0.042	PG	1		mg/kg	SC-SS-04	7	12	0.003	0.0047	1	NA	0.74	0.11	C	NA	NA	Y	ASL
	11096-82-5	PCB-1260	0.022	JP	0.046		mg/kg	BW-04	2	12	0.0028	0.0047	0.046	NA	0.74	0.22	C	NA	NA	N	BSL
	11100-14-4	PCB-1268	0.041	PG	0.46		mg/kg	SC-SS-06	4	12	0.0026	0.0042	0.46	NA	0.74	0.22	C	NA	NA	Y	BSL
	1746-01-6	2,3,7,8-TCDD	1.788E-07		0.0595		mg/kg	16	7	17	0.00013	0.0014	0.0595	NA	0.000018	0.0000045	C	NA	NA	Y	ASL
	7429-90-5	Aluminum	10800		27600	J	mg/kg	BW-03	5	5	NA	NA	27600	NA	99000	7700	N	NA	NA	Y	BSL
	7440-38-2	Arsenic	6.5		9.8	B	mg/kg	BW-04	2	5	2.9	3.5	9.8	NA	2.4	0.61	C	NA	NA	Y	ASL
	7440-39-3	Barium	26.1	B	132		mg/kg	BW-03	5	5	NA	NA	132	NA	19000	1500	N	NA	NA	N	BSL
	7440-41-7	Beryllium	0.75	B	0.75	B	mg/kg	BW-04	1	5	0.039	0.099	0.75	NA	200	16	N	NA	NA	N	BSL
	7440-43-9	Cadmium	0.42	B	2.2		mg/kg	BW-04	5	5	NA	NA	2.2	NA	9300	7	N	NA	NA	N	BSL
	7440-70-2	Calcium	2050		239000		mg/kg	BW-03	5	5	NA	NA	239000	NA	--	--	--	NA	NA	N	BSL
	16065-83-1	Chromium	88.8	J	25200	J	mg/kg	BW-03	5	5	NA	NA	25200	NA	150000	12000	N	NA	NA	Y	BSL
	7440-48-4	Cobalt	8	B	126		mg/kg	BW-04	5	5	NA	NA	126	NA	30	2.3	N	NA	NA	Y	ASL
	7440-50-8	Copper	11.5		23.8		mg/kg	BW-04	5	5	NA	NA	23.8	NA	4100	310	N	NA	NA	N	BSL
	7439-89-6	Iron	22300		72100		mg/kg	BW-04	5	5	NA	NA	72100	NA	72000	5500	N	NA	NA	Y	ASL

TABLE 2.4 - EASTERN AREA SUBSURFACE SOILS (0 TO 10 FEET)
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
SCCC, INC. SITE
KEARNY, NJ

Scenario Timeframe:	**Future**
Medium:	**Subsurface Soil (0-10 feet bgs)**
Exposure Medium:	**Subsurface Soil (0-10 feet bgs)**

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)[1]		Maximum Concentration (Qualifier)		Units	Location of Maximum Concentration	Detection Frequency		Range of Detection Limits		Concentration Used for Screening[2]	Background Value[3]	Toxicity Screening Value[4]			Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion[5]
									Detected	Total	Minimum	Maximum			Industrial	Residential	(N/C)				
	7439-92-1	Lead	10.5		110		mg/kg	BW-03	5	5	NA	NA	110	NA	800 [7]	400 [8]	N	NA	NA	N	BSL
	1284-72-6	Magnesium	4660		46800		mg/kg	BW-04	5	5	NA	NA	46800	NA	--	--	--	NA	NA	N	BSL
	7439-96-5	Manganese	209		933		mg/kg	BW-04	5	5	NA	NA	933	NA	2300	180	N	NA	NA	Y	**BSL**
	7439-97-6	Mercury	0.03	B	1.3		mg/kg	BW-03	5	5	NA	NA	1.3	NA	4.3	1	N	NA	NA	Y	**BSL**
	7440-02-0	Nickel	20.3	J	597	J	mg/kg	BW-04	5	5	NA	NA	597	NA	2000	150	N	NA	NA	Y	**BSL**
	7440-09-7	Potassium	292	B	2210		mg/kg	BW-04	5	5	NA	NA	2210	NA	--	--	--	NA	NA	N	BSL
	7782-49-2	Selenium	0.94	B	0.94	B	mg/kg	BW-04	1	5	0.36	0.46	0.94	NA	510	39	N	NA	NA	N	BSL
	7440-22-4	Silver	0.15	B	0.57	B	mg/kg	BW-04	5	5	NA	NA	0.57	NA	510	39	N	NA	NA	N	BSL
	7647-14-5	Sodium	882		2640		mg/kg	BW-04	5	5	NA	NA	2640	NA	--	--	--	NA	NA	N	BSL
	7440-28-0	Thallium	4.5		9.4		mg/kg	BW-03	4	5	0.64	0.64	9.4	NA	1	0.078	N	NA	NA	Y	ASL
	7440-62-2	Vanadium	38.6		1390		mg/kg	BW-04	5	5	NA	NA	1390	NA	510	39	N	NA	NA	Y	ASL
	7440-66-6	Zinc	49.2		223		mg/kg	BW-04	5	5	NA	NA	223	NA	31000	2300	N	NA	NA	N	BSL
	18540-29-9	Chromium, hexavalent	2100		3820		mg/kg	BW-01	4	5	0.4	0.4	3820	NA	5.6	0.29	C	NA	NA	Y	ASL

* = Screened using value for a similar compound
(1) J = Estimated value
B = Reported value is between Contract Required Detection Limit and Instrument Detection Limit
PG = Pecent difference between columns >25%
(2) Maximum detected concentration used for screening
(3) No background soil samples collected.
(4) USEPA, November 2013. Regional Screening Level (RSL) Summary Table (TR = 1E-6; HQ = 0.1). Lower of cancer/noncancer industrial soil concentration used for screening.
(5) ASL = Above screening level — ASL indicates that screening concentration exceeds industrial criterion. COPC will be addressed in risk calculations.
BSL = Below screening level — Bolding indicates that screening concentration exceeds residential criterion, but is less than industrial criterion. COPC will not be addressed in risk calculations.
(6) NA = Not applicable
(7) http://www.epa.gov/superfund/lead/almfaq.htm
(8) USEPA, August 1994. OSWER Directive 9355.4-12.

TABLE 2.5 - SHALLOW (FILL UNIT) GROUNDWATER
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN FOR DIRECT CONTACT
SCCC, INC. SITE
KEARNY, NJ

Scenario Timeframe:	Future
Medium:	Groundwater
Exposure Medium:	Groundwater

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)[1]		Maximum Concentration (Qualifier)		Units	Location of Maximum Concentration	Detection Frequency		Range of Detection Limits		Concentration Used for Screening[2]	Background Value[3]	Toxicity Screening Value[4]		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion[5]
									Detected	Total	Minimum	Maximum			Groundwater	(N/C)				
Groundwater	120-82-1	1,2,4-Trichlorobenzene	0.89	J	4.1	J	mg/L	PZ-4U	2	5	NA	0.42	0.0041	NA[6]	0.00039	N			Y	ASL
	95-50-1	1,2-Dichlorobenzene	0.84	J	10		mg/L	PZ-2U	4	5	NA	0.65	0.01	NA	0.0028	N	0.6	MCL	Y	ASL
	541-73-1	1,3-Dichlorobenzene*	2.6	J	3.4	J	mg/L	PZ-2U	3	5	NA	0.66	0.0034	NA	0.0028	N			Y	ASL
	106-46-7	1,4-Dichlorobenzene	1	J	4.4	J	mg/L	PZ-4U	4	5	NA	0.6	0.0044	NA	0.00042	C	0.075	MCL	Y	ASL
	67-64-1	Acetone	NA		0.017	J	mg/L	PZ-2U	1	5	NA	0.005	0.017	NA	1.2	N			N	BSL
	71-43-2	Benzene	0.0015	J	0.085		mg/L	MW-15U	3	5	NA	0.00081	0.085	NA	0.00039	C	0.005	MCL	Y	ASL
	108-90-7	Chlorobenzene	0.0024	J	0.32		mg/L	MW-15U	4	5	NA	0.00071	0.32	NA	0.0072	N			Y	ASL
	156-59-2	cis-1,2-Dichloroethene	NA		0.001		mg/L	PZ-4U	1	5	NA	0.001	0.001	NA	0.0028	N	0.07	MCL	N	BSL
	100-41-4	Ethylbenzene	NA		0.01		mg/L	PZ-3U	1	5	NA	0.00058	0.01	NA	0.0013	C	0.7	MCL	Y	ASL
	98-82-8	Isopropylbenzene	NA		0.0031	J	mg/L	PZ-3U	1	5	NA	0.00072	0.0031	NA	NA	N			N	BSL
	127-18-4	Tetrachloroethene	NA		0.00067		mg/L	PZ-4U	1	5	NA	0.00057	0.00067	NA	0.0035	N	0.005	MCL	N	BSL
		Xylene (total)	NA		0.039		mg/L	PZ-3U	1	5	NA	0.0024	0.039	NA	0.019	N	10	MCL	Y	ASL
	92-52-4	1,1'-Biphenyl	NA		0.028		mg/L	PZ-3U	1	5	0.00063	0.00075	0.028	NA	0.000083	N			Y	ASL
	105-67-9	2,4-Dimethylphenol	0.0033	J	0.012		mg/L	PZ-3U	4	5	NA	0.00065	0.012	NA	0.027	N			N	BSL
	91-57-6	2-Methylnaphthalene	0.0012	J	0.59		mg/L	PZ-3U	3	5	0.00049	0.00059	0.59	NA	0.0027	N			Y	ASL
	95-48-7	2-Methylphenol	0.0011	J	0.011	J	mg/L	PZ-4U	4	5	NA	0.00064	0.011	NA	0.072	N			N	BSL
	106-44-5	4-Methylphenol	0.0033	J	0.031		mg/L	MW-15U	4	5	NA	0.00092	0.031	NA	0.14	N			N	BSL
	83-32-9	Acenaphthene	0.0012	J	0.061		mg/L	PZ-3U	4	5	NA	0.00065	0.061	NA	0.04	N			Y	ASL
	208-96-8	Acenaphthylene*	NA		0.00085	J	mg/L	PZ-4U	1	5	0.00049	0.00058	0.00085	NA	0.04	N			N	BSL
	120-12-7	Anthracene	0.001	J	0.0014	J	mg/L	PZ-3U	2	5	0.00053	0.00063	0.0014	NA	0.13	N			N	BSL
	56-55-3	Benzo(a)anthracene	NA		0.0023	J	mg/L	PZ-4U	1	5	0.00043	0.00051	0.0023	NA	0.000029	C			Y	ASL
	50-32-8	Benzo(a)pyrene	NA		0.0022	J	mg/L	PZ-4U	1	5	0.00046	0.00055	0.0022	NA	0.0000029	C	0.0002	MCL	Y	ASL
	205-99-2	Benzo(b)fluoranthene	NA		0.0038	J	mg/L	PZ-4U	1	5	0.00033	0.00039	0.0038	NA	0.000029	C			Y	ASL
	191-24-2	Benzo(g,h,i)perylene	NA		0.0019	J	mg/L	PZ-4U	1	5	0.00029	0.00034	0.0019	NA	NA	--			N	BSL
	117-81-7	bis(2-Ethylhexyl)phthalate	0.0015	J	0.0026	J	mg/L	PZ-3U	3	5	0.0013	0.0014	0.0026	NA	0.0048	C	0.006	MCL	N	BSL
	105-60-2	Caprolactam	0.0032	J	0.005	J	mg/L	PZ-2U	3	5	0.002	0.0022	0.005	NA	0.77	N			N	BSL
	86-74-8	Carbazole	NA		0.0024	J	mg/L	PZ-3U	1	5	0.00055	0.00065	0.0024	NA	NA	--			N	BSL
	218-01-9	Chrysene	NA		0.0021	J	mg/L	PZ-4U	1	5	0.00037	0.00044	0.0021	NA	0.0029	C			N	BSL
	132-64-9	Dibenzofuran	NA		0.02	J	mg/L	PZ-3U	1	5	0.00056	0.00061	0.02	NA	NA	N			N	BSL
	206-44-0	Fluoranthene	0.00071	J	0.0038	J	mg/L	PZ-4U	2	5	0.00052	0.00062	0.0038	NA	0.063	N			N	BSL
	86-73-7	Fluorene	0.0039	J	0.01	J	mg/L	PZ-3U	2	5	0.00057	0.00062	0.01	NA	0.022	N			N	BSL
	193-39-5	Indeno(1,2,3-cd)pyrene	NA		0.0017	J	mg/L	PZ-4U	1	5	0.0005	0.00059	0.0017	NA	0	C			Y	ASL
	91-20-3	Naphthalene	0.0021	J	5		mg/L	PZ-3U	3	5	0.00045	0.00054	5	NA	0.000029	C			Y	ASL
	85-01-8	Phenanthrene*	0.00081	J	0.0052	J	mg/L	PZ-3U	4	5	NA	0.00069	0.0052	NA	0.13	N			N	BSL
	108-95-2	Phenol	0.0058	J	0.039		mg/L	MW-15U	4	5	NA	0.00028	0.039	NA	0.45	N			N	BSL
	129-00-0	Pyrene	NA		0.00029	J	mg/L	PZ-4U	1	5	0.00059	0.00071	0.00029	NA	0.0087	N			N	BSL
	7429-90-5	Aluminum	0.055	B	2.91		mg/L	PZ-4U	5	5	NA	NA	2.91	NA	1.6	N			Y	ASL
	7440-36-0	Antimony	NA		0.0044	B	mg/L	MW-15U	1	5	NA	0.0029	0.0044	NA	0.0006	N	0.006	MCL	Y	ASL
	7440-38-2	Arsenic	0.003		0.016		mg/L	PZ-3U	2	5	NA	0.0022	0.016	NA	0.000045	C	0.01	MCL	Y	ASL
	7440-39-3	Barium	0.0123	B	0.352	J	mg/L	MW-15U	5	5	NA	NA	0.352	NA	0.29	N	2	MCL	Y	ASL
	7440-43-9	Cadmium	0.00067	B	0.002	B	mg/L	PZ-4U	2	5	NA	0.00023	0.002	NA	0.00061	N	0.005	MCL	Y	ASL
	7440-70-2	Calcium	10.5	J	289	J	mg/L	PZ-2U	5	5	NA	NA	289	NA	NA	--			N	BSL
	16065-83-1	Chromium	0.0031	B	4.69		mg/L	PZ-2U	5	5	NA	NA	4.69	NA	1.6	N	0.1	MCL	Y	ASL
	7440-48-4	Cobalt	0.0028	B	0.0066	B	mg/L	PZ-4U	2	5	NA	0.0007	0.0066	NA	0.00047	N			Y	ASL
	7440-50-8	Copper	0.0012	B	0.0258	B	mg/L	PZ-1U	5	5	NA	NA	0.0258	NA	0.062	N	1.3	MCL	N	BSL
	7439-89-6	Iron	0.0334	B	46.1		mg/L	PZ-1U	5	5	NA	NA	46.1	NA	1.1	N			Y	ASL
	7439-92-1	Lead	0.0032		0.0377		mg/L	MW-15U	3	5	NA	0.0024	0.0377	NA	NA	N	0.015		Y	ASL
	1284-72-6	Magnesium	0.073	BJ	19.9	J	mg/L	MW-15U	5	5	NA	NA	19.9	NA	NA	--			N	BSL
	7439-96-5	Manganese	0.0242		0.701		mg/L	PZ-1U	4	5	NA	0.00032	0.701	NA	0.032	N			Y	ASL
	7439-97-6	Mercury	0.000076	B	0.00012	B	mg/L	PZ-3U	3	5	NA	0.000055	0.00012	NA	0.000063	N	0.002	MCL	Y	ASL
	7440-02-0	Nickel	0.0015	B	0.0317	B	mg/L	PZ-4U	5	5	NA	NA	0.0317	NA	0.03	N			Y	ASL
	7440-09-7	Potassium	1.14	B	14.4		mg/L	PZ-2U	5	5	NA	NA	14.4	NA	NA	--			N	BSL

TABLE 2.5 - SHALLOW (FILL UNIT) GROUNDWATER
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN FOR DIRECT CONTACT
SCCC, INC. SITE
KEARNY, NJ

Scenario Timeframe:	Future
Medium:	Groundwater
Exposure Medium:	Groundwater

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)(1)		Maximum Concentration (Qualifier)		Units	Location of Maximum Concentration	Detection Frequency		Range of Detection Limits		Concentration Used for Screening (2)	Background Value (3)	Toxicity Screening Value (4)		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion (5)
									Detected	Total	Minimum	Maximum			Groundwater	(N/C)				
	7440-22-4	Silver	0.00064	B	0.00089	B	mg/L	PZ-4U	2	5	NA	0.00059	0.00089	NA	0.0071	N			N	BSL
	7647-14-5	Sodium	8.78		195		mg/L	PZ-1U	5	5	NA	NA	195	NA	NA	--			N	BSL
	7440-28-0	Thallium	NA		0.0036	BJ	mg/L	PZ-1U	1	5	NA	0.0031	0.0036	NA	0.000016	N	0.002	MCL	Y	ASL
	7440-62-2	Vanadium	0.0013	BJ	0.135		mg/L	PZ-4U	4	5	NA	0.001	0.135	NA	0.0063	N			Y	ASL
	7440-66-6	Zinc	0.108		5.35		mg/L	PZ-4U	4	5	NA	0.0013	5.35	NA	0.47	N			Y	ASL
	18540-29-9	Chromium, hexavalent	0.453		4.07		mg/L	PZ-2U	2	5	0.01	0.25	4.07	NA	0.000031	C			Y	ASL

* = Screened using value for a similar compound
(1) J = Estimated value
B = Reported value is between Contract Required Detection Limit and Instrument Detection Limit
(2) Maximum detected concentration used for screening
(3) No background soil samples collected.
(4) USEPA, November 2013. Regional Screening Level (RSL) Summary Table (TR=1E-6; HQ=0.1). Lower of cancer/noncancer tapwater concentration used for screening.
(5) ASL = Above screening level ASL indicates that screening concentration exceeds tapwater criterion. COPC will be addressed in risk calculations.
BSL = Below screening level
(6) NA = Not applicable

TABLE 2.6 - SHALLOW (FILL UNIT) GROUNDWATER
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN FOR VAPOR INTRUSION
SCCC, INC. SITE
KEARNY, NJ

Scenario Timeframe:	Future
Medium:	Groundwater
Exposure Medium:	Indoor Air

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)(1)		Maximum Concentration (Qualifier)		Units	Location of Maximum Concentration	Detection Frequency		Range of Detection Limits		Concentration Used for Screening (2)	Background Value (3)	Vapor Intrusion Screening Value (4)		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion (5)
									Detected	Total	Minimum	Maximum			Groundwater	(N/C)				
Indoor Air	120-82-1	1,2,4-Trichlorobenzene	0.00089	J	0.0041	J	mg/L	PZ-4U	2	5	NA	0.42	0.0041	NA (6)	3.4	N			N	BSL
	95-50-1	1,2-Dichlorobenzene	0.00084	J	0.01		mg/L	PZ-2U	4	5	NA	0.65	0.01	NA	2.6	N	0.6	MCL	N	BSL
	541-73-1	1,3-Dichlorobenzene	0.0026	J	0.0034	J	mg/L	PZ-2U	3	5	NA	0.66	0.0034	NA	0.83	N			N	BSL
	106-46-7	1,4-Dichlorobenzene	0.001	J	0.0044	J	mg/L	PZ-4U	4	5	NA	0.6	0.0044	NA	8.2	C	0.075	MCL	N	BSL
	67-64-1	Acetone	NA		0.017	J	mg/L	PZ-2U	1	5	NA	0.005	0.017	NA	220	N			N	BSL
	71-43-2	Benzene	0.0015	J	0.085		mg/L	MW-15U	3	5	NA	0.00081	0.085	NA	0.014	C	0.005	MCL	Y	ASL
	108-90-7	Chlorobenzene	0.0024	J	0.32		mg/L	MW-15U	4	5	NA	0.00071	0.32	NA	0.39	N			N	BSL
	156-59-2	cis-1,2-Dichloroethene	NA		0.001		mg/L	PZ-4U	1	5	NA	0.001	0.001	NA	0.21	N	0.07	MCL	N	BSL
	100-41-4	Ethylbenzene	NA		0.01		mg/L	PZ-3U	1	5	NA	0.00058	0.01	NA	0.7	C	0.7	MCL	N	BSL
	98-82-8	Isopropylbenzene	NA		0.0031	J	mg/L	PZ-3U	1	5	NA	0.00072	0.0031	NA	NA	N			N	BSL
	127-18-4	Tetrachloroethene	NA		0.00067		mg/L	PZ-4U	1	5	NA	0.00057	0.00067	NA	0.011	N	0.005	MCL	N	BSL
		Xylene (total)	NA		0.039		mg/L	PZ-3U	1	5	NA	0.0024	0.039	NA	23	N	10	MCL	N	BSL
	92-52-4	1,1'-Biphenyl	NA		0.028		mg/L	PZ-3U	1	5	0.00063	0.00075	0.028	NA	NA	N			N	BSL
	105-67-9	2,4-Dimethylphenol	0.0033	J	0.012		mg/L	PZ-3U	4	5	NA	0.00065	0.012	NA	NA	N			N	BSL
	91-57-6	2-Methylnaphthalene	0.0012	J	0.59		mg/L	PZ-3U	3	5	0.00049	0.00059	0.59	NA	3.3	N			N	BSL
	95-48-7	2-Methylphenol	0.0011	J	0.011	J	mg/L	PZ-4U	4	5	NA	0.00064	0.011	NA	NA	N			N	BSL
	106-44-5	4-Methylphenol	0.0033	J	0.031		mg/L	MW-15U	4	5	NA	0.00092	0.031	NA	NA	N			N	BSL
	83-32-9	Acenaphthene	0.0012	J	0.061		mg/L	PZ-3U	4	5	NA	0.00065	0.061	NA	NA	N			N	BSL
	208-96-8	Acenaphthylene*	NA		0.00085	J	mg/L	PZ-4U	1	5	0.00049	0.00058	0.00085	NA	NA	N			N	BSL
	120-12-7	Anthracene	0.001	J	0.0014	J	mg/L	PZ-3U	2	5	0.00053	0.00063	0.0014	NA	NA	N			N	BSL
	56-55-3	Benzo(a)anthracene	NA		0.0023	J	mg/L	PZ-4U	1	5	0.00043	0.00051	0.0023	NA	NA	C			N	BSL
	50-32-8	Benzo(a)pyrene	NA		0.0022	J	mg/L	PZ-4U	1	5	0.00046	0.00055	0.0022	NA	NA	C	0.0002	MCL	N	BSL
	205-99-2	Benzo(b)fluoranthene	NA		0.0038	J	mg/L	PZ-4U	1	5	0.00033	0.00039	0.0038	NA	NA	C			N	BSL
	191-24-2	Benzo(g,h,i)perylene	NA		0.0019	J	mg/L	PZ-4U	1	5	0.00029	0.00034	0.0019	NA	NA	--			N	BSL
	117-81-7	bis(2-Ethylhexyl)phthalate	0.0015	J	0.0026	J	mg/L	PZ-3U	3	5	0.0013	0.0014	0.0026	NA	NA	C	0.006	MCL	N	BSL
	105-60-2	Caprolactam	0.0032	J	0.005	J	mg/L	PZ-2U	3	5	0.002	0.0022	0.005	NA	NA	--			N	BSL
	86-74-8	Carbazole	NA		0.0024	J	mg/L	PZ-3U	1	5	0.00055	0.00065	0.0024	NA	NA	--			N	BSL
	218-01-9	Chrysene	NA		0.0021	J	mg/L	PZ-4U	1	5	0.00037	0.00044	0.0021	NA	NA	C			N	BSL
	132-64-9	Dibenzofuran	NA		0.02	J	mg/L	PZ-3U	1	5	0.00056	0.00061	0.02	NA	NA	N			N	BSL
	206-44-0	Fluoranthene	0.00071	J	0.0038	J	mg/L	PZ-4U	2	5	0.00052	0.00062	0.0038	NA	NA	N			N	BSL
	86-73-7	Fluorene	0.0039	J	0.01	J	mg/L	PZ-3U	2	5	0.00057	0.00062	0.01	NA	NA	N			N	BSL
	193-39-5	Indeno(1,2,3-cd)pyrene	NA		0.0017	J	mg/L	PZ-4U	1	5	0.0005	0.00059	0.0017	NA	NA	C			N	BSL
	91-20-3	Naphthalene	0.0021	J	5		mg/L	PZ-3U	3	5	0.00045	0.00054	5	NA	0.15	C			Y	ASL
	85-01-8	Phenanthrene*	0.00081	J	0.0052	J	mg/L	PZ-3U	4	5	NA	0.00069	0.0052	NA	N	BSL			N	BSL
	108-95-2	Phenol	0.0058	J	0.039		mg/L	MW-15U	4	5	NA	0.00028	0.039	NA	NA	N			N	BSL
	129-00-0	Pyrene	NA		0.00029	J	mg/L	PZ-4U	1	5	0.00059	0.00071	0.00029	NA	NA	N			N	BSL
	7429-90-5	Aluminum	0.055	B	2.91		mg/L	PZ-4U	5	5	NA	NA	2.91	NA	NA	N			N	BSL
	7440-36-0	Antimony	NA		0.0044	B	mg/L	MW-15U	1	5	NA	0.0029	0.0044	NA	NA	N	0.006	MCL	N	BSL
	7440-38-2	Arsenic	0.003		0.016		mg/L	PZ-3U	2	5	NA	0.0022	0.016	NA	NA	C	0.01	MCL	N	BSL
	7440-39-3	Barium	0.0123	B	0.352	J	mg/L	MW-15U	5	5	NA	NA	0.352	NA	NA	N	2	MCL	N	BSL
	7440-43-9	Cadmium	0.00067	B	0.002	B	mg/L	PZ-4U	2	5	NA	0.00023	0.002	NA	NA	N	0.005	MCL	N	BSL
	7440-70-2	Calcium	10.5	J	289	J	mg/L	PZ-2U	5	5	NA	NA	289	NA	NA	--			N	BSL
	16065-83-1	Chromium	0.0031	B	4.69		mg/L	PZ-2U	5	5	NA	NA	4.69	NA	NA	N	0.1	MCL	N	BSL
	7440-48-4	Cobalt	0.0028	B	0.0066	B	mg/L	PZ-4U	2	5	NA	0.0007	0.0066	NA	NA	N			N	BSL
	7440-50-8	Copper	0.0012	B	0.0258	B	mg/L	PZ-1U	5	5	NA	NA	0.0258	NA	NA	N	1.3	MCL	N	BSL
	7439-89-6	Iron	0.0334	B	46.1		mg/L	PZ-1U	5	5	NA	NA	46.1	NA	NA	N			N	BSL
	7439-92-1	Lead	0.0032		0.0377		mg/L	MW-15U	3	5	NA	0.0024	0.0377	NA	NA	N			N	BSL
	1284-72-6	Magnesium	0.073	BJ	19.9	J	mg/L	MW-15U	5	5	NA	NA	19.9	NA	NA	--			N	BSL
	7439-96-5	Manganese	0.0242		0.701		mg/L	PZ-1U	4	5	NA	0.00032	0.701	NA	NA	N			N	BSL
	7439-97-6	Mercury	0.000076	B	0.00012	B	mg/L	PZ-3U	3	5	NA	0.000055	0.00012	NA	NA	N	0.002	MCL	N	BSL
	7440-02-0	Nickel	0.0015	B	0.0317	B	mg/L	PZ-4U	5	5	NA	NA	0.0317	NA	NA	N			N	BSL
	7440-09-7	Potassium	1.14	B	14.4		mg/L	PZ-2U	5	5	NA	NA	14.4	NA	NA	--			N	BSL
	7440-22-4	Silver	0.00064	B	0.00089	B	mg/L	PZ-4U	2	5	NA	0.00059	0.00089	NA	NA	N			N	BSL
	7647-14-5	Sodium	8.78		195		mg/L	PZ-1U	5	5	NA	NA	195	NA	NA	--			N	BSL
	7440-28-0	Thallium	NA		0.0036	BJ	mg/L	PZ-1U	1	5	NA	0.0031	0.0036	NA	NA	N	0.002	MCL	N	BSL
	7440-62-2	Vanadium	0.0013	BJ	0.135		mg/L	PZ-4U	4	5	NA	0.001	0.135	NA	NA	N			N	BSL
	7440-66-6	Zinc	0.108		5.35		mg/L	PZ-4U	4	5	NA	0.0013	5.35	NA	NA	N			N	BSL
	18540-29-9	Chromium, hexavalent	0.453		4.07		mg/L	PZ-2U	2	5	0.01	0.25	4.07	NA	NA	C			N	BSL

* = Screened using value for a similar compound
(1) J = Estimated value
B = Reported value is between Contract Required Detection Limit and Instrument Detection Limit
(2) Maximum detected concentration used for screening
(3) No background soil samples collected.
(4) USEPA, November 2002. OSWER Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (TR = 1E-5; Table 2b).
(5) ASL = Above screening level   ASL indicates that screening concentration exceeds vapor intrusion criterion. COPC will be addressed in risk calculations
BSL = Below screening level
(6) NA = Not applicable

TABLE 3.1.CT - WESTERN AREA SURFACE SOIL (0 TO 2 FEET)
EXPOSURE POINT CONCENTRATION SUMMARY
CENTRAL TENDENCY
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Current/Future**
Medium:	**Surface Soil (0-2 feet bgs)**
Exposure Medium:	**Surface Soil (0-2 feet bgs)**

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL		Maximum Concentration		Exposure Point Concentration			
				Value	Distribution (1)	Value	Qualifier	Value	Units	Statistic (2)	Rationale (3)
Onsite Surface Soil Particulates Volatile Emissions	1,2,3-Trichlorobenzene	mg/kg	16.5	234.5	U	210		16.5	mg/kg	Mean	CTE
	1,2,4-Trichlorobenzene	mg/kg	32.2	98.71	U	480		32.2	mg/kg	Mean	CTE
	1,4-Dichlorobenzene	mg/kg	28.7	73.15	L	360		28.7	mg/kg	Mean	CTE
	Benzene	mg/kg	0.82	7.8	U	7.8	J	0.82	mg/kg	Mean	CTE
	Benzo(a)pyrene	mg/kg	0.56	1.06	L	1.6		0.56	mg/kg	Mean	CTE
	Benzo(b)fluoranthene	mg/kg	0.95	1.72	L	2.2		0.95	mg/kg	Mean	CTE
	Dibenz(a,h)anthracene	mg/kg	0.16	0.2	N	0.45		0.16	mg/kg	Mean	CTE
	PCB-1260	mg/kg	0.31	0.8	L	4.2		0.31	mg/kg	Mean	CTE
	2,3,7,8-TCDD	mg/kg	1.69E-04	2.94E-04	L	0.00114525		1.69E-04	mg/kg	Mean	CTE
	Antimony	mg/kg	27	48.9	L	202		27	mg/kg	Mean	CTE
	Arsenic	mg/kg	10.2	8.63	N	17.7		10.2	mg/kg	Mean	CTE
	Cobalt	mg/kg	88	129	N	221		88	mg/kg	Mean	CTE
	Iron	mg/kg	71083	97080	U	198000		71083	mg/kg	Mean	CTE
	Lead	mg/kg	4606	44994	U	57300		4606	mg/kg	Mean	CTE
	Vanadium	mg/kg	602	888	U	1670		602	mg/kg	Mean	CTE
	Zinc	mg/kg	3546	35527	U	45300		3546	mg/kg	Mean	CTE
	Chromium, hexavalent	mg/kg	499	1743	L	3390		499	mg/kg	Mean	CTE

(1) U = Undetermined distribution
L = Lognormal distribution
N = Normal distribution
(2) Statistical tests used to determine UCL:
Mean = arithmetic average concentration of hits and nondetects
(3) Rationale for selection of appropriate EPC:
CTE = Central tendency exposure represents an average exposure, based on typical or average exposure parameters

TABLE 3.1.RME - WESTERN AREA SURFACE SOIL (0-2 FEET)
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Current/Future**
Medium:	**Surface Soil (0-2 feet bgs)**
Exposure Medium:	**Surface Soil (0-2 feet bgs)**

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL		Maximum Concentration		Exposure Point Concentration			
				Value	Distribution [1]	Value	Qualifier	Value	Units	Statistic [2]	Rationale [3]
On-site Surface Soil Particulates Volatile Emissions	1,2,3-Trichlorobenzene	mg/kg	16.5	234.5	U	210		210	mg/kg	Maximum	UCL > Max
	1,2,4-Trichlorobenzene	mg/kg	32.2	98.71	U	480		98.71	mg/kg	KM (t)	ProUCL 5.0
	1,4-Dichlorobenzene	mg/kg	28.7	73.15	L	360		73.15	mg/kg	KM (t)	ProUCL 5.0
	Benzene	mg/kg	0.82	NA	U	7.8	J	7.8	mg/kg	Maximum	Only one detection
	Benzo(a)pyrene	mg/kg	0.56	1.06	L	1.6		1.06	mg/kg	KM (Ch)	ProUCL 5.0
	Benzo(b)fluoranthene	mg/kg	0.95	1.72	L	2.2		1.72	mg/kg	KM (Ch)	ProUCL 5.0
	Dibenz(a,h)anthracene	mg/kg	0.16	0.2	N	0.45		0.2	mg/kg	KM (t)	ProUCL 5.0
	PCB-1260	mg/kg	0.31	0.8	L	4.2		0.8	mg/kg	KM (t)	ProUCL 5.0
	2,3,7,8-TCDD	mg/kg	1.69E-04	2.94E-04	L	1.15E-03		2.94E-04	mg/kg	KM(BCA)	ProUCL 5.0
	Antimony	mg/kg	27	48.9	L	202		48.9	mg/kg	KM (t)	ProUCL 5.0
	Arsenic	mg/kg	10.2	8.63	N	17.7		8.63	mg/kg	KM (t)	ProUCL 5.0
	Cobalt	mg/kg	88	129	N	221		129	mg/kg	KM (t)	ProUCL 5.0
	Iron	mg/kg	71083	97080	U	198000		97080	mg/kg	Stud. t	ProUCL 5.0
	Lead	mg/kg	4606	44994	U	57300		44994	mg/kg	Cheb	ProUCL 5.0
	Vanadium	mg/kg	602	888	U	1670		888	mg/kg	Stud. t	ProUCL 5.0
	Zinc	mg/kg	3546	35527	U	45300		35527	mg/kg	Cheb	ProUCL 5.0
	Chromium, hexavalent	mg/kg	499	1743	L	3390		1743	mg/kg	AG	ProUCL 5.0

(1) U = Undetermined distribution
L = Lognormal distribution
N = Normal distribution
(2) Statistical tests used to determine UCL:
Maximum = maximum detected concentration
KM(t) = UCL based on Kaplan-Meier estimates using the Student's t-distribution cutoff value
KM(Ch) = UCL based on Kaplan- Meier estimates using the Chebyshev inequality
KM(BCA) = UCL based on Kaplan-Meier estimates using the bias-corrected bootstrap method
Stud. t = UCL based on the Student's t test.
Cheb = UCL based on estimates using the Chebyshev inequality
AG = Adjusted gamma 95% UCL
(3) Rationale for selection of appropriate EPC:
UCL > Max = UCL concentration determined by ProUCL 5.0 exceeded the maximum detected concentration, therefore maximum concentration is used as the EPC
ProUCL 5.0 = The best fit, based on multiple goodness of fit tests performed by ProUCL 5.0, is selected as the EPC
Only one detection = One positive detection, therefore maximum detction is used

TABLE 3.2.CT - EASTERN AREA SUBSURFACE SOIL (0 TO 10 FEET)
EXPOSURE POINT CONCENTRATION SUMMARY
CENTRAL TENDENCY
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Future**
Medium:	**Subsurface Soil (0-10 feet bgs)**
Exposure Medium:	**Subsurface Soil (0-10 feet bgs)**

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL		Maximum Concentration		Exposure Point Concentration			
				Value	Distribution (1)	Value	Qualifier	Value	Units	Statistic (2)	Rationale (3)
On-site	1,2,4-Trichlorobenzene	mg/kg	41863	251940	U	200000		41863	mg/kg	Mean	CTE
Subsurface Soil	1,2-Dichlorobenzene	mg/kg	1812	5090	U	6470		1812	mg/kg	Mean	CTE
Particulates	1,3-Dichlorobenzene	mg/kg	479	811	U	1550		479	mg/kg	Mean	CTE
Volatile Emissions	1,4-Dichlorobenzene	mg/kg	849	1681	U	4840		849	mg/kg	Mean	CTE
	Benzo(a)anthracene	mg/kg	12.6	6.6	N	22		12.6	mg/kg	Mean	CTE
	Benzo(a)pyrene	mg/kg	9.1	12.5	L	37		9.1	mg/kg	Mean	CTE
	Benzo(b)fluoranthene	mg/kg	17.1	22.3	L	65.8		17.1	mg/kg	Mean	CTE
	Dibenz(a,h)anthracene	mg/kg	4.35	3	L	8.8		4.35	mg/kg	Mean	CTE
	Hexachlorobenzene	mg/kg	40	80.7	L	359		40	mg/kg	Mean	CTE
	Indeno(1,2,3-cd)pyrene	mg/kg	10.7	18.8	L	35.9		10.7	mg/kg	Mean	CTE
	Naphthalene	mg/kg	55	179	L	448		55	mg/kg	Mean	CTE
	PCB-1248	mg/kg	0.73	1.4	U	2.5		0.73	mg/kg	Mean	CTE
	PCB-1254	mg/kg	0.32	0.56	U	1		0.32	mg/kg	Mean	CTE
	2,3,7,8-TCDD	mg/kg	0.0054	0.07	U	0.0595		0.0054	mg/kg	Mean	CTE

(1) U = Undetermined distribution
N = Normal distribution
L = Lognormal distriburion
(2) Statistical tests used to determine UCL:
Mean = arithmetic average concentration of hits and nondetects
(3) Rationale for selection of appropriate EPC:
CTE = Central tendency exposure represents an average exposure, based on typical or average exposure parameters

TABLE 3.2.RME - EASTERN AREA SURFACE SOIL (0-2 FEET)
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Current/Future**
Medium:	**Surface Soil (0-2 feet bgs)**
Exposure Medium:	**Surface Soil (0-2 feet bgs)**

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL		Maximum Concentration		Exposure Point Concentration			
				Value	Distribution [1]	Value	Qualifier	Value	Units	Statistic [2]	Rationale [3]
On-site	1,2,4-Trichlorobenzene	mg/kg	41863	251940	U	200000		200000	mg/kg	Maximum	UCL>Max
Surface Soil	1,2-Dichlorobenzene	mg/kg	1812	5090	U	6470		5090	mg/kg	KM(Ch)	ProUCL 5.0
Particulates	1,3-Dichlorobenzene	mg/kg	479	811	U	1550		811	mg/kg	KM(t)	ProUCL 5.0
Volatile Emissions	1,4-Dichlorobenzene	mg/kg	849	1681	U	4840		1681	mg/kg	KM(t)	ProUCL 5.0
	Benzo(a)anthracene	mg/kg	12.6	6.6	N	22		6.6	mg/kg	KM(t)	ProUCL 5.0
	Benzo(a)pyrene	mg/kg	9.11	12.5	L	37		12.5	mg/kg	KM(BCA)	ProUCL 5.0
	Benzo(b)fluoranthene	mg/kg	17.1	22.3	L	65.8		22.3	mg/kg	KM(t)	ProUCL 5.0
	Dibenz(a,h)anthracene	mg/kg	4.35	3	L	8.8		3	mg/kg	AG	ProUCL 5.0
	Hexachlorobenzene	mg/kg	40	80.7	L	359		80.7	mg/kg	KM(BCA)	ProUCL 5.0
	Indeno(1,2,3-cd)pyrene	mg/kg	10.7	18.8	L	35.9		18.8	mg/kg	KM(Ch)	ProUCL 5.0
	Naphthalene	mg/kg	55	179	L	448		179	mg/kg	KM(Ch)	ProUCL 5.0
	PCB-1248	mg/kg	0.73	1.4	U	2.5		1.4	mg/kg	KM(t)	ProUCL 5.0
	PCB-1254	mg/kg	0.32	0.56	U	1		0.56	mg/kg	Stud. T	ProUCL 5.0
	2,3,7,8-TCDD	mg/kg	0.0054	0.07	U	0.0595		0.0595	mg/kg	Maximum	UCL>Max

(1) U = Undetermined distribution
N = Normal distribution
L = Lognormal distriburion
(2) Statistical tests used to determine UCL:
Maximum = maximum detected concentration
KM(t) = UCL based on Kaplan-Meier estimates using the Student's t-distribution cutoff value.
KM(Ch) = UCL based on Kaplan- Meier estimates using the Chebyshev inequality
KM(BCA) = UCL based on Kaplan-Meier estimates using the bias-corrected bootstrap method
Stud. t = UCL based on the Student's t test.
Cheb = UCL based on estimates using the Chebyshev inequality
AG = Adjusted gamma 95% UCL
(3) Rationale for selection of appropriate EPC:
UCL > Max = UCL concentration determined by ProUCL 5.0 exceeded the maximum detected concentration, therefore maximum concentration is used as the EPC.
ProUCL 5.0 = The best fit, based on multiple goodness of fit tests performed by ProUCL 5.0, is selected as the EPC.

TABLE 3.3.CT - WESTERN AREA SUBSURFACE SOIL (0 TO 10 FEET)
EXPOSURE POINT CONCENTRATION SUMMARY
CENTRAL TENDENCY
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Current/Future**
Medium:	**Subsurface Soil (0-10 feet bgs)**
Exposure Medium:	**Subsurface Soil (0-10 feet bgs)**

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL		Maximum Concentration		Exposure Point Concentration			
				Value	Distribution (1)	Value	Qualifier	Value	Units	Statistic (2)	Rationale (3)
On-site	1,2,3-Trichlorobenzene	mg/kg	17.4	204	U	210		17.4	mg/kg	Mean	CTE
Surface Soil	1,2,4-Trichlorobenzene	mg/kg	76.7	174	U	1300		76.7	mg/kg	Mean	CTE
Particulates	1,2-Dichlorobenzene	mg/kg	359	684	L	3300		359	mg/kg	Mean	CTE
Volatile Emissions	1,3-Dichlorobenzene	mg/kg	357	651	L	3300		357	mg/kg	Mean	CTE
	1,4-Dichlorobenzene	mg/kg	413	806	L	5200		413	mg/kg	Mean	CTE
	Benzene	mg/kg	4.92	18.25	L	110	J	4.92	mg/kg	Mean	CTE
	Chlorobenzene	mg/kg	43.1	134	U	630		43.1	mg/kg	Mean	CTE
	Ethylbenzene	mg/kg	9.09	88.4	U	450		9.09	mg/kg	Mean	CTE
	m,p-Xylenes	mg/kg	115	NA	U	1700		115	mg/kg	Mean	CTE
	o-Xylene	mg/kg	41.1	NA	U	600		41.1	mg/kg	Mean	CTE
	1,1'-Biphenyl	mg/kg	2.11	15.5	L	22		2.11	mg/kg	Mean	CTE
	1,2,4,5-Tetrachlorobenzene	mg/kg	16.4	44.1	L	210		16.4	mg/kg	Mean	CTE
	Benzo(a)anthracene	mg/kg	6.2	37.8	L	87		6.2	mg/kg	Mean	CTE
	Benzo(a)pyrene	mg/kg	5.5	33.8	L	82		5.5	mg/kg	Mean	CTE
	Benzo(b)fluoranthene	mg/kg	5.22	26.2	L	58		5.22	mg/kg	Mean	CTE
	Dibenz(a,h)anthracene	mg/kg	0.5	1.35	L	4.9		0.5	mg/kg	Mean	CTE
	Indeno(1,2,3-cd)pyrene	mg/kg	4.02	22.1	L	54		4.02	mg/kg	Mean	CTE
	Naphthalene	mg/kg	5.33	42.3	L	110		5.33	mg/kg	Mean	CTE
	PCB-1260	mg/kg	0.26	0.5	U	4.2		0.26	mg/kg	Mean	CTE
	2,3,7,8-TCDD	mg/kg	4.20E-04	9.95E-04	L	4.150E-03		4.20E-04	mg/kg	Mean	CTE
	Antimony	mg/kg	22.9	33.8	L	202		22.9	mg/kg	Mean	CTE
	Arsenic	mg/kg	15	17.8	L	54.9		15	mg/kg	Mean	CTE
	Cobalt	mg/kg	66.25	147	L	221		66.25	mg/kg	Mean	CTE
	Iron	mg/kg	58399	78539	U	198000		58399	mg/kg	Mean	CTE
	Lead	mg/kg	3628	14447	U	57300		3628	mg/kg	Mean	CTE
	Thallium	mg/kg	7.02	2.34	U	5		2.34	mg/kg	Mean	CTE
	Vanadium	mg/kg	458	926	U	1670		458	mg/kg	Mean	CTE
	Zinc	mg/kg	2659	11396	U	45300		2659	mg/kg	Mean	CTE
	Chromium, hexavalent	mg/kg	992	4231	U	11000		992	mg/kg	Mean	CTE

(1) U = Undetermined distribution
L = Lognormal distribution
(2) Statistical tests used to determine UCL:
Mean = arithmetic average concentration of hits and nondetects
(3) Rationale for selection of appropriate EPC:
CTE = Central tendency exposure represents an average exposure, based on typical or average exposure parameters.

TABLE 3.3.RME - WESTERN A[illegible]UBSURFACE SOIL (0-10 FEET)
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Future**
Medium:	**Subsurface Soil (0-10 feet bgs)**
Exposure Medium:	**Subsurface Soil (0-10 feet bgs)**

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL		Maximum Concentration		Exposure Point Concentration			
				Value	Distribution (1)	Value	Qualifier	Value	Units	Statistic (2)	Rationale (3)
On-site Subsurface Soil Particulates Volatile Emissions	1,2,3-Trichlorobenzene	mg/kg	17.4	204	U	210		204	mg/kg	KM(Ch)	ProUCL 5.0
	1,2,4-Trichlorobenzene	mg/kg	76.7	174	U	1300		174	mg/kg	KM(t)	ProUCL 5.0
	1,2-Dichlorobenzene	mg/kg	359	684	L	3300		684	mg/kg	KM(BCA)	ProUCL 5.0
	1,3-Dichlorobenzene	mg/kg	357	651	L	3300		651	mg/kg	KM(BCA)	ProUCL 5.0
	1,4-Dichlorobenzene	mg/kg	413	806	L	5200		806	mg/kg	KM(BCA)	ProUCL 5.0
	Benzene	mg/kg	4.92	18.25	L	110	J	18.25	mg/kg	KM(Ch)	ProUCL 5.0
	Chlorobenzene	mg/kg	43.1	134	U	630		134	mg/kg	KM(Ch)	ProUCL 5.0
	Ethylbenzene	mg/kg	9.09	88.4	U	450		88.4	mg/kg	KM(Ch)	ProUCL 5.0
	m,p-Xylenes	mg/kg	115	NA	U	1700		1700	mg/kg	Maximum	Only one detection
	o-Xylene	mg/kg	41.1	NA	U	600		600	mg/kg	Maximum	Only one detection
	1,1'-Biphenyl	mg/kg	2.11	15.5	L	22		15.52	mg/kg	KM(Ch)	ProUCL 5.0
	1,2,4,5-Tetrachlorobenzene	mg/kg	16.4	44.1	L	210		44.1	mg/kg	KM(BCA)	ProUCL 5.0
	Benzo(a)anthracene	mg/kg	6.2	37.8	L	87		37.8	mg/kg	KM(Ch)	ProUCL 5.0
	Benzo(a)pyrene	mg/kg	5.5	33.8	L	82		33.8	mg/kg	KM(Ch)	ProUCL 5.0
	Benzo(b)fluoranthene	mg/kg	5.22	26.2	L	58		26.2	mg/kg	KM(Ch)	ProUCL 5.0
	Dibenz(a,h)anthracene	mg/kg	0.5	1.35	L	4.9		1.35	mg/kg	KM(Ch)	ProUCL 5.0
	Indeno(1,2,3-cd)pyrene	mg/kg	4.02	22.1	L	54		22.1	mg/kg	KM(Ch)	ProUCL 5.0
	Naphthalene	mg/kg	5.33	42.3	L	110		42.3	mg/kg	KM(Ch)	ProUCL 5.0
	PCB-1260	mg/kg	0.26	0.5	U	4.2		0.5	mg/kg	KM(t)	ProUCL 5.0
	2,3,7,8-TCDD	mg/kg	4.20E-04	9.95E-04	L	4.15E-03		9.95E-04	mg/kg	KM(Ch)	ProUCL 5.0
	Antimony	mg/kg	22.9	33.8	L	202		33.8	mg/kg	KM(t)	ProUCL 5.0
	Arsenic	mg/kg	15	17.8	L	54.9		17.8	mg/kg	KM(%boot)	ProUCL 5.0
	Cobalt	mg/kg	66.25	147	L	221		147	mg/kg	KM(Ch)	ProUCL 5.0
	Iron	mg/kg	58399	78539	U	198000		78539	mg/kg	Stud. t	ProUCL 5.0
	Lead	mg/kg	3628	14447	U	57300		14447	mg/kg	Cheb	ProUCL 5.0
	Thallium	mg/kg	7.02	2.34	U	5		2.35	mg/kg	KM(t)	ProUCL 5.0
	Vanadium	mg/kg	458	926	U	1670		926	mg/kg	AG	ProUCL 5.0
	Zinc	mg/kg	2659	11396	U	45300		11396	mg/kg	Cheb	ProUCL 5.0
	Chromium, hexavalent	mg/kg	992	4231	U	11000		4231	mg/kg	KM(Ch)	ProUCL 5.0

(1) U = Undetermined distributior
L = Lognormal distributior
(2) Statistical tests used to determine UCL
Maximum = maximum detected concentratior
KM(Ch) = UCL based on Kaplan-Meier estimates using the Chebyshev inequalit
KM(t) = UCL based on Kaplan-Meier estimates using the Student's t-distribution cutoff value
KM(BCA) = UCL based on Kaplan-Meier estimates using the bias-corrected bootstrap metho
Stud. t = UCL based on the Student's t test
Cheb = UCL based on estimates using the Chebyshev inequalit
KM(%boot) = UCL based on Kaplan-Meier estimates using the percentile bootsrap methoc
AG = Adjusted gamma 95% UCL
(3) Rationale for selection of appropriate EPC
ProUCL 5.0 = The best fit, based on multiple goodness of fit tests performed by ProUCL 5.0, is selected as the EPC
Only one detection =One positive detection, therefore maximum detection is usec

TABLE 3.4.CT - EASTERN AREA SUBSURFACE SOIL (0 TO 10 FEET)
EXPOSURE POINT CONCENTRATION SUMMARY
CENTRAL TENDENCY
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Future**
Medium:	**Subsurface Soil (0-10 feet bgs)**
Exposure Medium:	**Subsurface Soil (0-10 feet bgs)**

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL		Maximum Concentration		Exposure Point Concentration			
				Value	Distribution (1)	Value	Qualifier	Value	Units	Statistic (2)	Rationale (3)
On-site Subsurface Soil Particulates Volatile Emissions	1,2,4-Trichlorobenzene	mg/kg	28781	90405	L	200000	J	28781	mg/kg	Mean	CTE
	1,2-Dichlorobenzene	mg/kg	1246	2167	L	6470		1246	mg/kg	Mean	CTE
	1,3-Dichlorobenzene	mg/kg	330	573	L	1550		330	mg/kg	Mean	CTE
	1,4-Dichlorobenzene	mg/kg	584	1250	L	4840		584	mg/kg	Mean	CTE
	Benzo(a)anthracene	mg/kg	10	4.8	U	22		10	mg/kg	Mean	CTE
	Benzo(a)pyrene	mg/kg	7.2	9.7	L	37		7.2	mg/kg	Mean	CTE
	Benzo(b)fluoranthene	mg/kg	13.6	27.1	G	65.8		13.6	mg/kg	Mean	CTE
	Dibenz(a,h)anthracene	mg/kg	3.6	2.2	U	8.8		3.6	mg/kg	Mean	CTE
	Hexachlorobenzene	mg/kg	31.5	59.6	L	359		31.5	mg/kg	Mean	CTE
	Indeno(1,2,3-cd)pyrene	mg/kg	8.5	10	G	35.9		8.5	mg/kg	Mean	CTE
	Naphthalene	mg/kg	142	1054	L	2000		142	mg/kg	Mean	CTE
	PCB-1248	mg/kg	0.43	0.85	U	2.5		0.43	mg/kg	Mean	CTE
	PCB-1254	mg/kg	0.19	0.34	L	1		0.19	mg/kg	Mean	CTE
	2,3,7,8-TCDD	mg/kg	0.0038	9.96E-03	L	0.0595		0.0038	mg/kg	Mean	CTE
	Arsenic	mg/kg	5.2	NA	U	9.8	B	5.2	mg/kg	Mean	CTE
	Cobalt	mg/kg	72	120	U	126		72	mg/kg	Mean	CTE
	Iron	mg/kg	47280	65150	U	72100		47280	mg/kg	Mean	CTE
	Thallium	mg/kg	5.8	9.3	U	9.4		5.8	mg/kg	Mean	CTE
	Vanadium	mg/kg	503	1002	U	1390		503	mg/kg	Mean	CTE
	Chromium, hexavalent	mg/kg	2252	3640	U	3820		2252	mg/kg	Mean	CTE

(1) U = Undetermined distribution
L = Lognormal distribution
G = Gamma distribution
(2) Statistical tests used to determine UCL:
Mean = arithmetic average concentration of hits and nondetects
(3) Rationale for selection of appropriate EPC:
CTE = Central tendency exposure represents an average exposure, based on typical or average exposure parameters

TABLE 3.4.RME - EASTERN AREA SUBSURFACE SOIL (0-10 FEET)
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Future**
Medium:	**Subsurface Soil (0-10 feet bgs)**
Exposure Medium:	**Subsurface Soil (0-10 feet bgs)**

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL		Maximum Concentration		Exposure Point Concentration			
				Value	Distribution (1)	Value	Qualifier	Value	Units	Statistic (2)	Rationale (3)
On-site	1,2,4-Trichlorobenzene	mg/kg	28781	90405	L	200000	J	90405	mg/kg	KM(Ch)	ProUCL 5.0
Subsurface Soil	1,2-Dichlorobenzene	mg/kg	1246	2167	L	6470		2167	mg/kg	KM(BCA)	ProUCL 5.0
Particulates	1,3-Dichlorobenzene	mg/kg	330	573	L	1550		573	mg/kg	KM(t)	ProUCL 5.0
Volatile Emissions	1,4-Dichlorobenzene	mg/kg	584	1250	L	4840		1250	mg/kg	KM(BCA)	ProUCL 5.0
	Benzo(a)anthracene	mg/kg	10	4.8	U	22		4.8	mg/kg	KM(t)	ProUCL 5.0
	Benzo(a)pyrene	mg/kg	7.2	9.7	L	37		9.7	mg/kg	KM(BCA)	ProUCL 5.0
	Benzo(b)fluoranthene	mg/kg	13.6	27.1	G	65.8		27.1	mg/kg	KM(Ch)	ProUCL 5.0
	Dibenz(a,h)anthracene	mg/kg	3.6	2.2	U	8.8		2.2	mg/kg	KM(t)	ProUCL 5.0
	Hexachlorobenzene	mg/kg	31.5	59.6	L	359		59.6	mg/kg	KM(t)	ProUCL 5.0
	Indeno(1,2,3-cd)pyrene	mg/kg	8.5	10	G	35.9		10	mg/kg	KM(t)	ProUCL 5.0
	Naphthalene	mg/kg	142	1054	L	2000		1054	mg/kg	KM(Ch)	ProUCL 5.0
	PCB-1248	mg/kg	0.43	0.85	U	2.5		0.85	mg/kg	KM(t)	ProUCL 5.0
	PCB-1254	mg/kg	0.19	0.34	L	1		0.34	mg/kg	KM(t)	ProUCL 5.0
	2,3,7,8-TCDD	mg/kg	0.0038	9.96E-03	L	0.0595		9.96E-03	mg/kg	KM(t)	ProUCL 5.0
	Arsenic	mg/kg	5.2	NA	U	9.8	B	9.8	mg/kg	Maximum	Only two detections
	Cobalt	mg/kg	72	120	U	126		120	mg/kg	KM(t)	ProUCL 5.0
	Iron	mg/kg	47280	65150	U	72100		65150	mg/kg	KM(t)	ProUCL 5.0
	Thallium	mg/kg	5.8	9.3	U	9.4		9.3	mg/kg	KM(t)	ProUCL 5.0
	Vanadium	mg/kg	503	1002	U	1390		1002	mg/kg	KM(t)	ProUCL 5.0
	Chromium, hexavalent	mg/kg	2252	3640	U	3820		3640	mg/kg	KM(t)	ProUCL 5.0

(1) U = Undetermined distribution
L = Lognormal distribution
G = Gamma distribution

(2) Statistical tests used to determine UCL:
Maximum = maximum detected concentration
KM(t) = UCL based on Kaplan-Meier estimates using the Student's t-distribution cutoff value.
KM(Ch) = UCL based on Kaplan- Meier estimates using the Chebyshev inequality
KM(BCA) = UCL based on Kaplan-Meier estimates using the bias-corrected bootstrap method

(3) Rationale for selection of appropriate EPC:
ProUCL 5.0 = The best fit, based on multiple goodness of fit tests performed by ProUCL 5.0, is selected as the EPC.
Only two detections =Two positive detections, therefore maximum detection is used.

TABLE 3.5.CT - SHALLOW (FILL UNIT) GROUNDWATER
EXPOSURE POINT CONCENTRATION SUMMARY FOR DIRECT CONTACT
CENTRAL TENDENCY
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Future**
Medium:	**Groundwater**
Exposure Medium:	**Groundwater**

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL		Maximum Concentration		Exposure Point Concentration			
				Value	Distribution (1)	Value	Qualifier	Value	Units	Statistic (2)	Rationale (3)
On-site Groundwater	1,2,4-Trichlorobenzene	mg/L	0.0012	--	U	0.0041	J	0.0012	mg/L	Mean	CTE
	1,2-Dichlorobenzene	mg/L	0.004	--	U	0.01		0.004	mg/L	Mean	CTE
	1,3-Dichlorobenzene	mg/L	0.002	--	U	0.0034	J	0.002	mg/L	Mean	CTE
	1,4-Dichlorobenzene	mg/L	0.0027	--	U	0.0044	J	0.0027	mg/L	Mean	CTE
	Benzene	mg/L	0.02	--	U	0.085		0.02	mg/L	Mean	CTE
	Chlorobenzene	mg/L	0.07	--	U	0.32		0.07	mg/L	Mean	CTE
	Ethylbenzene	mg/L	0.0025	--	U	0.01		0.0025	mg/L	Mean	CTE
	Xylene (total)	mg/L	0.01	--	U	0.039		0.01	mg/L	Mean	CTE
	1,1'-Biphenyl	mg/L	0.006	--	U	0.028		0.006	mg/L	Mean	CTE
	2-Methylnaphthalene	mg/L	0.12	--	U	0.59		0.12	mg/L	Mean	CTE
	Acenaphthene	mg/L	0.015	--	U	0.061		0.015	mg/L	Mean	CTE
	Benzo(a)anthracene	mg/L	0.0008	--	U	0.0023	J	0.0008	mg/L	Mean	CTE
	Benzo(a)pyrene	mg/L	0.0008	--	U	0.0022	J	0.0008	mg/L	Mean	CTE
	Benzo(b)fluoranthene	mg/L	0.001	--	U	0.0038	J	0.001	mg/L	Mean	CTE
	Indeno(1,2,3-cd)pyrene	mg/L	0.0008	--	U	0.0017	J	0.0008	mg/L	Mean	CTE
	Naphthalene	mg/L	1	--	U	5		1	mg/L	Mean	CTE
	Aluminum	mg/L	1.2	--	U	2.91		1.2	mg/L	Mean	CTE
	Antimony	mg/L	0.0032	--	U	0.0044	B	0.0032	mg/L	Mean	CTE
	Arsenic	mg/L	0.005	--	U	0.016		0.005	mg/L	Mean	CTE
	Barium	mg/L	0.17	--	U	0.352	J	0.17	mg/L	Mean	CTE
	Cadmium	mg/L	0.0007	--	U	0.002	B	0.0007	mg/L	Mean	CTE
	Chromium	mg/L	1.7	--	U	4.69		1.7	mg/L	Mean	CTE
	Cobalt	mg/L	0.0023	--	U	0.0066	B	0.0023	mg/L	Mean	CTE
	Iron	mg/L	12.5	--	U	46.1		12.5	mg/L	Mean	CTE
	Lead	mg/L	0.012	--	U	0.0377		0.012	mg/L	Mean	CTE
	Manganese	mg/L	0.26	--	U	0.701		0.26	mg/L	Mean	CTE
	Mercury	mg/L	0.000008	--	U	0.00012	B	0.000008	mg/L	Mean	CTE
	Nickel	mg/L	0.011	--	U	0.0317	B	0.011	mg/L	Mean	CTE
	Thallium	mg/L	0.0032	--	U	0.0036	BJ	0.0032	mg/L	Mean	CTE
	Vanadium	mg/L	0.039	--	U	0.135		0.039	mg/L	Mean	CTE
	Zinc	mg/L	1.5	--	U	5.35		1.5	mg/L	Mean	CTE
	Chromium, hexavalent	mg/L	0.96	--	U	4.07		0.96	mg/L	Mean	CTE

(1) U = Undetermined distribution - Only 5 data points. Distribution not determined.
(2) Statistical tests used to determine UCL:
Mean = arithmetic average concentration of hits and nondetects
(3) Rationale for selection of appropriate EPC:
CTE = Central tendency exposure represents an average exposure, based on typical or average exposure parameters

TABLE 3.5.RME - SHALLOW (FILL UNIT) GROUNDWATER
EXPOSURE POINT CONCENTRATION SUMMARY FOR DIRECT CONTACT
REASONABLE MAXIMUM EXPOSURE
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Future**
Medium:	**Groundwater**
Exposure Medium:	**Groundwater**

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL		Maximum Concentration		Exposure Point Concentration			
				Value	Distribution (1)	Value	Qualifier	Value	Units	Statistic (2)	Rationale (3)
On-site Groundwater	1,2,4-Trichlorobenzene	mg/L	0.0012	--	U	0.0041	J	0.0041	mg/L	Maximum	Only 5 samples
	1,2-Dichlorobenzene	mg/L	0.004	--	U	0.01		0.01	mg/L	Maximum	Only 5 samples
	1,3-Dichlorobenzene	mg/L	0.002	--	U	0.0034	J	0.0034	mg/L	Maximum	Only 5 samples
	1,4-Dichlorobenzene	mg/L	0.0027	--	U	0.0044	J	0.0044	mg/L	Maximum	Only 5 samples
	Benzene	mg/L	0.02	--	U	0.085		0.085	mg/L	Maximum	Only 5 samples
	Chlorobenzene	mg/L	0.07	--	U	0.32		0.32	mg/L	Maximum	Only 5 samples
	Ethylbenzene	mg/L	0.0025	--	U	0.01		0.01	mg/L	Maximum	Only 5 samples
	Xylene (total)	mg/L	0.01	--	U	0.039		0.039	mg/L	Maximum	Only 5 samples
	1,1'-Biphenyl	mg/L	0.006	--	U	0.028		0.028	mg/L	Maximum	Only 5 samples
	2-Methylnaphthalene	mg/L	0.12	--	U	0.59		0.59	mg/L	Maximum	Only 5 samples
	Acenaphthene	mg/L	0.015	--	U	0.061		0.061	mg/L	Maximum	Only 5 samples
	Benzo(a)anthracene	mg/L	0.0008	--	U	0.0023	J	0.0023	mg/L	Maximum	Only 5 samples
	Benzo(a)pyrene	mg/L	0.0008	--	U	0.0022	J	0.0022	mg/L	Maximum	Only 5 samples
	Benzo(b)fluoranthene	mg/L	0.001	--	U	0.0038	J	0.0038	mg/L	Maximum	Only 5 samples
	Indeno(1,2,3-cd)pyrene	mg/L	0.0008	--	U	0.0017	J	0.0017	mg/L	Maximum	Only 5 samples
	Naphthalene	mg/L	1	--	U	5		5	mg/L	Maximum	Only 5 samples
	Aluminum	mg/L	1.2	--	U	2.91		2.91	mg/L	Maximum	Only 5 samples
	Antimony	mg/L	0.0032	--	U	0.0044	B	0.0044	mg/L	Maximum	Only 5 samples
	Arsenic	mg/L	0.005	--	U	0.016		0.016	mg/L	Maximum	Only 5 samples
	Barium	mg/L	0.17	--	U	0.352	J	0.352	mg/L	Maximum	Only 5 samples
	Cadmium	mg/L	0.0007	--	U	0.002	B	0.002	mg/L	Maximum	Only 5 samples
	Chromium	mg/L	1.7	--	U	4.69		4.69	mg/L	Maximum	Only 5 samples
	Cobalt	mg/L	0.0023	--	U	0.0066	B	0.0066	mg/L	Maximum	Only 5 samples
	Iron	mg/L	12.5	--	U	46.1		46.1	mg/L	Maximum	Only 5 samples
	Lead	mg/L	0.012	--	U	0.0377		0.0377	mg/L	Maximum	Only 5 samples
	Manganese	mg/L	0.26	--	U	0.701		0.701	mg/L	Maximum	Only 5 samples
	Mercury	mg/L	0.000008	--	U	0.00012	B	0.00012	mg/L	Maximum	Only 5 samples
	Nickel	mg/L	0.011	--	U	0.0317	B	0.0317	mg/L	Maximum	Only 5 samples
	Thallium	mg/L	0.0032	--	U	0.0036	BJ	0.0036	mg/L	Maximum	Only 5 samples
	Vanadium	mg/L	0.039	--	U	0.135		0.135	mg/L	Maximum	Only 5 samples
	Zinc	mg/L	1.5	--	U	5.35		5.35	mg/L	Maximum	Only 5 samples
	Chromium, hexavalent	mg/L	0.96	--	U	4.07		4.07	mg/L	Maximum	Only 5 samples

(1) U = Undetermined distribution - Only 5 data points. Distribution not determined.
(2) Statistical tests used to determine UCL:
Mean = arithmetic average concentration of hits and nondetects
(3) Rationale for selection of appropriate EPC:
Only five samples. Distribution not estimated. Maximum used for EPC

TABLE 3.6.CT - SHALLOW (FILL UNIT) GROUNDWATER
EXPOSURE POINT CONCENTRATION SUMMARY FOR VAPOR INTRUSION
CENTRAL TENDENCY
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Future**
Medium:	**Groundwater**
Exposure Medium:	**Indoor Air**

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL		Maximum Concentration		Exposure Point Concentration			
				Value	Distribution [1]	Value	Qualifier	Value	Units	Statistic [2]	Rationale [3]
Indoor Air	Benzene	mg/L	0.02	--	U	0.085		0.02	mg/L	Mean	CTE
	Naphthalene	mg/L	1	--	U	5		1	mg/L	Mean	CTE

(1) U = Undetermined distribution - Only 5 data points. Distribution not determined
(2) Statistical tests used to determine UCL:
Mean = arithmetic average concentration of hits and nondetects
(3) Rationale for selection of appropriate EPC:
CTE = Central tendency exposure represents an average exposure, based on typical or average exposure parameters

TABLE 3.6.RME - SHALLOW (FILL UNIT) GROUNDWATER
EXPOSURE POINT CONCENTRATION SUMMARY FOR VAPOR INTRUSION
REASONABLE MAXIMUM EXPOSURE
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Future**
Medium:	**Groundwater**
Exposure Medium:	**Indoor Air**

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL		Maximum Concentration		Exposure Point Concentration			
				Value	Distribution (1)	Value	Qualifier	Value	Units	Statistic (2)	Rationale (3)
Indoor Air	Benzene	mg/L	0.02	--	U	0.085		0.085	mg/L	Maximum	Only 5 samples
	Naphthalene	mg/L	1	--	U	5		5	mg/L	Maximum	Only 5 samples

(1) U = Undetermined distribution - Only 5 data points. Distribution not determined
(2) Statistical tests used to determine UCL:
Mean = arithmetic average concentration of hits and nondetects
(3) Rationale for selection of appropriate EPC:
Maximum used for EPC. Only 5 samples collected.

TABLE 4.1.CT - CURRENT/FUTURE SOIL EXPOSURE
VALUES USED FOR DAILY INTAKE CALCULATIONS
CENTRAL TENDENCY
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Current/Future**
Medium:	**Surface Soil**
Exposure Medium:	**Surface Soil**

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name (1)
Ingestion	Onsite Visitor	Adult	Onsite Surface Soil	CS	Chemical Concentration in Soil	See Table 3.1.CT See Table 3.2.CT	mg/kg	NA	Intake (mg/kg/day) = CS x IR_s x CF x FI x EF x ED x 1/BW x 1/AT
				IR_s	Soil Ingestion Rate	50	mg soil/day	USEPA, September 2011	
				CF	Conversion Factor	1.00E-06	kg/mg	NA	
				FI	Fraction Ingested from Source	0.5	unitless	Assumes 50% of soil ingestion occurs on site during non-invasive activities	
				EF	Exposure Frequency	50	days/yr	Assume 1 day/week	
				ED	Exposure Duration	5	yr	Average job tenure, Bureau of Labor Statistics, 2102	
				BW	Body Weight	80	kg	USEPA, September 2011	
				AT-C	Averaging Time - Cancer	28470	days	USEPA, September 2011	
				AT-N	Averaging Time - Non-Cancer	1825	days	USEPA, December 1989	
Dermal Contact	Onsite Visitor	Adult	Onsite Surface Soil	CS	Chemical Concentration in Soil	See Table 3.1.CT See Table 3.2.CT	mg/kg	NA	Dermally Absorbed Dose (DAD) (mg/kg/day) = CS x CF x AF x ABS x EF x ED x EV x SA x 1/BW x 1/AT
				CF	Conversion Factor	1.00E-06	kg/mg	NA	
				AF	Adherence Factor of Soil to Skin	0.02	mg/cm^2	Geometric Mean for Groundskeepers, USEPA, July 2004	
				ABS	Dermal Absorption Fraction	Chemical-Specific See Section 6.2.2	unitless	USEPA, July 2004	
				EF	Exposure Frequency	50	days/yr	Assume 1 day/week	
				ED	Exposure Duration	5	yr	Average job tenure, Bureau of Labor Statistics, 2012	
				EV	Event Frequency	1	event/day	USEPA, July 2004	
				SA	Skin Surface Area Available for Contact	3300	cm^2	Assumes head, hands, and forearms; USEPA, July 2004	
				BW	Body Weight	80	kg	USEPA, September 2011	
				AT-C	Averaging Time - Cancer	28470	days	USEPA, September 2011	
				AT-N	Averaging Time - Non-Cancer	1825	days	USEPA,December 1989	

TABLE 4.1.CT - CURRENT/FUTURE SOIL EXPOSURE
VALUES USED FOR DAILY INTAKE CALCULATIONS
CENTRAL TENDENCY
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Current/Future**
Medium:	**Surface Soil**
Exposure Medium:	**Surface Soil**

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name [1]
Inhalation	Onsite Visitor	Adult	Onsite Surface Soil	CS	Chemical Concentration in Soil	See Table 3.1.CT See Table 3.2.CT	mg/kg	NA	Intake (mg/kg-day) = CS x IR x CF x ET x EF x ED x (1/VF + 1/PEF) x 1/BW x 1/AT
				EF	Exposure Frequency	50	days/yr	Assume 1 day/week	
				ED	Exposure Duration	5	yr	Average job tenure, Bureau of Labor Statistics, 2012	
				ET	Exposure Time	8	hr/day	Assumed	
				IR	Inhalation Rate	1.20E-02	m^3/min	mean, light intensity activity, USEPA, September 2011	
				CF	Conversion Factor	60	min/hr	NA	
				BW	Body Weight	80	kg	USEPA, September 2011	
				VF	Volatilization Factor	Chemical-specific	m^3/kg	USEPA, November 2013	
				PEF	Particulate Emission Factor	1.40E+09	m^3/kg	USEPA, November 2013	
				AT-C	Averaging Time - Cancer	28470	days	USEPA, September 2011	
				AT-N	Averaging Time - Non-Cancer	1825	days	USEPA,December 1989	
Ingestion	HCTS Operator	Adult	Onsite Surface Soil	CS	Chemical Concentration in Soil	See Table 3.1.CT See Table 3.2.CT	mg/kg	NA	Intake (mg/kg/day) = CS x IR_s x CF x FI x EF x ED x 1/BW x 1/AT
				IR_s	Soil Ingestion Rate	50	mg soil/day	USEPA, September 2011	
				CF	Conversion Factor	1.00E-06	kg/mg	NA	
				FI	Fraction Ingested from Source	0.5	unitless	Assumes 50% of soil ingestion occurs on site during non-invasive activities	
				EF	Exposure Frequency	225	days/yr	USEPA, December 2002	
				ED	Exposure Duration	5	yr	Average job tenure, Bureau of Labor Statistics, 2012	
				BW	Body Weight	80	kg	USEPA, September 2011	
				AT-C	Averaging Time - Cancer	28470	days	USEPA, September 2011	
				AT-N	Averaging Time - Non-Cancer	1825	days	USEPA, December 1989	

TABLE 4.1.CT - CURRENT/FUTURE SOIL EXPOSURE
VALUES USED FOR DAILY INTAKE CALCULATIONS
CENTRAL TENDENCY
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Current/Future**
Medium:	**Surface Soil**
Exposure Medium:	**Surface Soil**

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name [1]
Dermal Contact	HCTS Operator	Adult	Onsite Surface Soil	CS	Chemical Concentration in Soil	See Table 3.1.CT See Table 3.2.CT	mg/kg	NA	Dermally Absorbed Dose (DAD) (mg/kg/day) = CS x CF x AF x ABS x EF x ED x EV x SA x 1/BW x 1/AT
				CF	Conversion Factor	1.00E-06	kg/mg	NA	
				AF	Adherence Factor of Soil to Skin	0.02	mg/cm^2	Geometric Mean for Groundskeepers, USEPA, July 2004	
				ABS	Dermal Absorption Fraction	Chemical-Specific See Section 6.2.2	unitless	USEPA, July 2004	
				EF	Exposure Frequency	225	days/yr	USEPA, December 2002	
				ED	Exposure Duration	5	yr	Average job tenure, Bureau of Labor Statistics, 2012	
				EV	Event Frequency	1	event/day	USEPA, July 2004	
				SA	Skin Surface Area Available for Contact	3300	cm^2	Assumes head, hands, and forearms; USEPA, July 2004	
				BW	Body Weight	80	kg	USEPA, September 2011	
				AT-C	Averaging Time - Cancer	28470	days	USEPA, September 2011	
				AT-N	Averaging Time - Non-Cancer	1825	days	USEPA,December 1989	
Inhalation	HCTS Operator	Adult	Onsite Surface Soil	CS	Chemical Concentration in Soil	See Table 3.1.CT See Table 3.2.CT	mg/kg	NA	Intake (mg/kg-day) = CS x IR x CF x ET x EF x ED x (1/VF + 1/PEF) x 1/BW x 1/AT
				EF	Exposure Frequency	225	days/yr	USEPA, December 2002	
				ED	Exposure Duration	5	yr	Average job tenure, Bureau of Labor Statistics, 2012	
				ET	Exposure Time	4	hr/day	Conservative, based on job duties	
				IR	Inhalation Rate	1.20E-02	m^3/min	mean, light intensity activity, USEPA, September 2011	
				CF	Conversion Factor	60	min/hr	NA	
				BW	Body Weight	80	kg	USEPA, September 2011	
				VF	Volatilization Factor	Chemical-specific	m^3/kg	USEPA, November 2013	
				PEF	Particulate Emission Factor	1.40E+09	m^3/kg	USEPA, November 2013	
				AT-C	Averaging Time - Cancer	28470	days	USEPA, September 2011	
				AT-N	Averaging Time - Non-Cancer	1825	days	USEPA,December 1989	
Ingestion	Outdoor Industrial Worker	Adult	Onsite Surface Soil	CS	Chemical Concentration in Soil	See Table 3.1.CT See Table 3.2.CT	mg/kg	NA	Intake (mg/kg/day) = CS x IR_s x CF x FI x EF x ED x 1/BW x 1/AT
				IR_s	Soil Ingestion Rate	50	mg soil/day	USEPA, September 2011	
				CF	Conversion Factor	1.00E-06	kg/mg	NA	
				FI	Fraction Ingested from Source	0.75	unitless	Assumes 75% of soil ingestion during the day occurs during	
				EF	Exposure Frequency	225	days/yr	USEPA, December 2002	
				ED	Exposure Duration	5	yr	Average job tenure, Bureau of Labor Statistics, 2012	
				BW	Body Weight	80	kg	USEPA, September 2011	
				AT-C	Averaging Time - Cancer	28470	days	USEPA, September 2011	
				AT-N	Averaging Time - Non-Cancer	1825	days	USEPA, December 1989	

TABLE 4.1.CT - CURRENT/FUTURE SOIL EXPOSURE
VALUES USED FOR DAILY INTAKE CALCULATIONS
CENTRAL TENDENCY
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Current/Future**
Medium:	**Surface Soil**
Exposure Medium:	**Surface Soil**

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name [1]
Dermal Contact	Outdoor Industrial Worker	Adult	Onsite Surface Soil	CS	Chemical Concentration in Soil	See Table 3.1.CT See Table 3.2.CT	mg/kg	NA	Dermally Absorbed Dose (DAD) (mg/kg/day) = CS x CF x AF x ABS x EF x ED x EV x SA x 1/BW x 1/AT
				CF	Conversion Factor	1.00E-06	kg/mg	NA	
				AF	Adherence Factor of Soil to Skin	0.02	mg/cm^2	Geometric Mean for Groundskeepers, USEPA, July [illegible]	
				ABS	Dermal Absorption Fraction	Chemical-specific See Section 6.2.2	unitless	USEPA, July 2004	
				EF	Exposure Frequency	225	days/yr	USEPA, December 2002	
				ED	Exposure Duration	5	yr	Average job tenure, Bureau of Labor Statistics, 2012	
				EV	Event Frequency	1	event/day	USEPA, July 2004	
				SA	Skin Surface Area Available for Contact	3300	cm^2	Assumes head, hands and forearms, USEPA, July 2004	
				BW	Body Weight	80	kg	USPEA, September 2011	
				AT-C	Averaging Time - Cancer	28470	days	USPEA, September 2011	
				AT-N	Averaging Time - Non-Cancer	1825	days	USEPA, December 1989	
Inhalation	Outdoor Industrial Worker	Adult	Onsite Surface Soil	CS	Chemical Concentration in Soil	See Table 3.1.CT See Table 3.2.CT	mg/kg	NA	Intake (mg/kg-day) = CS x IR x CF x ET x EF x ED x (1/VF + 1/PEF) x 1/BW x 1/AT
				EF	Exposure Frequency	225	days/yr	USEPA, December 2002	
				ED	Exposure Duration	5	yr	Average job tenure, Bureau of Labor Statistics, 2012	
				ET	Exposure Time	8	hr/day	Assumed	
				IR	Inhalation Rate	1.30E-02	m^3/min	Mean, light intensity activity, USEPA, September 2011	
				CF	Conversion Factor	60	min/hr	NA	
				BW	Body Weight	80	kg	USEPA, September 2011	
				VF	Volatilization Factor	Chemical-specific	m^3/kg	USEPA, November 2013	
				PEF	Particulate Emission Factor	1.40E+09	m^3/kg	USEPA, November 2013	
				AT-C	Averaging Time - Cancer	28470	days	USEPA,September 2011	
				AT-N	Averaging Time - Non-Cancer	9125	days	USEPA,December 1989	

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USEPA, December 2002. Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24
USEPA, July 2004. Risk Assessment Guidance for Superfund - Volume I - Human Health Evaluation Manual (Part E). EPA 540/1-89/002
USEPA, September 2011. Exposure Factors Handbook: 2011 Edition. EPA/600/R-090/052F
USEPA, November 2013. User's Guide - Regional Screening Table. <http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/index.htm>

TABLE 4.2.RME - CURRENT/FUTURE SOIL EXPOSURE
VALUES USED FOR DAILY INTAKE CALCULATIONS
REASONABLE MAXIMUM EXPOSURE
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Current/Future**
Medium:	**Surface Soil**
Exposure Medium:	**Surface Soil**

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name [1]
Ingestion	Onsite Visitor	Adult	Onsite Surface Soil	CS	Chemical Concentration in Soil	See Table 3.1.RME See Table 3.2.RME	mg/kg	NA	Intake (mg/kg/day) = CS x IR_s x CF x FI x EF x ED x 1/BW x 1/AT
				IR_s	Soil Ingestion Rate	200	mg soil/day	USEPA, September 2011	
				CF	Conversion Factor	1.00E-06	kg/mg	NA	
				FI	Fraction Ingested from Source	0.5	unitless	Assumes 50% of soil ingestion occurs on site during non-invasive activities	
				EF	Exposure Frequency	100	days/yr	Assume 2 days/week	
				ED	Exposure Duration	25	yr	USEPA, December 1989	
				BW	Body Weight	80	kg	USEPA, September 2011	
				AT-C	Averaging Time - Cancer	28470	days	USEPA, September 2011	
				AT-N	Averaging Time - Non-Cancer	9125	days	USEPA,December 1989	
Dermal Contact	Onsite Visitor	Adult	Onsite Surface Soil	CS	Chemical Concentration in Soil	See Table 3.1.RME See Table 3.2.RME	mg/kg	NA	Dermally Absorbed Dose (DAD) (mg/kg/day) = CS x CF x AF x ABS x EF x ED x EV x SA x 1/BW x 1/AT
				CF	Conversion Factor	1.00E-06	kg/mg	NA	
				AF	Adherence Factor of Soil to Skin	0.1	mg/cm^2	95th percentile for groundskeepers, USEPA, July 2004	
				ABS	Dermal Absorption Fraction	Chemical-Specific See Section 6.2.2	unitless	USEPA, July 2004	
				EF	Exposure Frequency	100	days/yr	Assume 2 days/week	
				ED	Exposure Duration	25	yr	USEPA, December 1989	
				EV	Event Frequency	1	event/day	USEPA, July 2004	
				SA	Skin Surface Area Available for Contact	3300	cm^2	Assumes head, hands, arms and legs; USEPA, September 2011	
				BW	Body Weight	80	kg	USEPA, September 2011	
				AT-C	Averaging Time - Cancer	28470	days	USEPA, September 2011	
				AT-N	Averaging Time - Non-Cancer	9125	days	USEPA,December 1989	

TABLE 4.2.RME - CURRENT/FUTURE SOIL EXPOSURE
VALUES USED FOR DAILY INTAKE CALCULATIONS
REASONABLE MAXIMUM EXPOSURE
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Current/Future**
Medium:	**Surface Soil**
Exposure Medium:	**Surface Soil**

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name [(1)]
Inhalation	Onsite Visitor	Adult	Onsite Surface Soil	CS	Chemical Concentration in Soil	See Table 3.1.RME See Table 3.2.RME	mg/kg	NA	Intake (mg/kg-day) = CS x IR x CF x ET x EF x ED x (1/VF + 1/PEF) x 1/BW x 1/AT
				EF	Exposure Frequency	100	days/yr	Assume 2 days/week	
				ED	Exposure Duration	25	yr	USEPA, December 1989	
				ET	Exposure Time	8	hr/day	Assumed	
				IR	Inhalation Rate	1.60E-02	m^3/min	95th percentile, light intensity activity, USEPA, September 2011	
				CF	Conversion Factor	60	min/hr	NA	
				BW	Body Weight	80	kg	USEPA, September 2011	
				VF	Volatilization Factor	Chemical-specific	m^3/kg	USEPA, November 2013	
				PEF	Particulate Emission Factor	1.40E+09	m^3/kg	USEPA, November 2013	
				BW	Body Weight	80	kg	USEPA, September 2011	
				AT-C	Averaging Time - Cancer	28470	days	USEPA, September 2011	
				AT-N	Averaging Time - Non-Cancer	9125	days	USEPA,December 1989	
Ingestion	Operator	Adult	Onsite Surface Soil	CS	Chemical Concentration in Soil	See Table 3.1.RME See Table 3.2.RME	mg/kg	NA	Intake (mg/kg/day) = CS x IR_s x CF x FI x EF x ED x 1/BW x 1/AT
				IR_s	Soil Ingestion Rate	200	mg soil/day	USEPA, September 2011	
				CF	Conversion Factor	1.00E-06	kg/mg	NA	
				FI	Fraction Ingested from Source	0.5	unitless	Assumes 50% of soil ingestion occurs on site during non-invasive activities	
				EF	Exposure Frequency	225	days/yr	USEPA, December 2002	
				ED	Exposure Duration	25	yr	USEPA, December 1989	
				BW	Body Weight	80	kg	USEPA, September 2011	
				AT-C	Averaging Time - Cancer	28470	days	USEPA, September 2011	
				AT-N	Averaging Time - Non-Cancer	9125	days	USEPA,December 1989	

TABLE 4.2.RME - CURRENT/FUTURE SOIL EXPOSURE
VALUES USED FOR DAILY INTAKE CALCULATIONS
REASONABLE MAXIMUM EXPOSURE
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Current/Future**
Medium:	**Surface Soil**
Exposure Medium:	**Surface Soil**

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name (1)
Dermal Contact	Operator	Adult	Onsite Surface Soil	CS	Chemical Concentration in Soil	See Table 3.1.RME See Table 3.2.RME	mg/kg	NA	Dermally Absorbed Dose (DAD) (mg/kg/day) = CS x CF x AF x ABS x EF x ED x EV x SA x 1/BW x 1/AT
				CF	Conversion Factor	1.00E-06	kg/mg	NA	
				AF	Adherence Factor of Soil to Skin	0.1	mg/cm^2	95th percentile, USEPA, July 2004	
				ABS	Dermal Absorption Fraction	Chemical-Specific See Section 6.2.2	unitless	USEPA, July 2004	
				EF	Exposure Frequency	225	days/yr	USEPA, December 2002	
				ED	Exposure Duration	25	yr	USEPA, December 1989	
				EV	Event Frequency	1	event/day	USEPA, July 2004	
				SA	Skin Surface Area Available for Contact	3300	cm^2	Assumes head, hands, arms and legs; USEPA, September 2011	
				BW	Body Weight	80	kg	USEPA, September 2011	
				AT-C	Averaging Time - Cancer	28470	days	USEPA, September 2011	
				AT-N	Averaging Time - Non-Cancer	9125	days	USEPA,December 1989	
Inhalation	Operator	Adult	Onsite Surface Soil	CS	Chemical Concentration in Soil	See Table 3.1.RME See Table 3.2.RME	mg/kg	NA	Intake (mg/kg-day) = CS x IR x CF x ET x EF x ED x (1/VF + 1/PEF) x 1/BW x 1/AT
				EF	Exposure Frequency	225	days/yr	USEPA, December 2002	
				ED	Exposure Duration	25	yr	USEPA, December 1989	
				ET	Exposure Time	2	hr/day	Based on job duties	
				IR	Inhalation Rate	1.60E-02	m^3/min	95th percentile, light intensity activity, USEPA, September 2011	
				CF	Conversion Factor	60	min/hr	NA	
				BW	Body Weight	80	kg	USEPA, September 2011	
				VF	Volatilization Factor	Chemical-specific	m^3/kg	USEPA, November 2013	
				PEF	Particulate Emission Factor	1.40E+09	m^3/kg	USEPA, November 2013	
				BW	Body Weight	80	kg	USEPA, September 2011	
				AT-C	Averaging Time - Cancer	28470	days	USEPA, September 2011	
				AT-N	Averaging Time - Non-Cancer	9125	days	USEPA,December 1989	
Ingestion	Outdoor Industrial Worker	Adult	Onsite Surface Soil	CS	Chemical Concentration in Soil	See Table 3.1.RME See Table 3.2.RME	mg/kg	NA	Intake (mg/kg/day) = $CS \times IR_s \times CF \times FI \times EF \times ED \times 1/BW \times 1/AT$
				IR_s	Soil Ingestion Rate	200	mg soil/day	USEPA, September 2011	
				CF	Conversion Factor	1.00E-06	kg/mg	NA	
				FI	Fraction Ingested from Source	0.75	unitless	Assumes 75% of soil ingestion during the day occurs during working hours	
				EF	Exposure Frequency	225	days/yr	Outdoor Worker, USEPA, December 2002	
				ED	Exposure Duration	25	yr	USEPA, December 1989	
				BW	Body Weight	80	kg	USEPA, September 2011	
				AT-C	Averaging Time - Cancer	28470	days	USEPA, September 2011	
				AT-N	Averaging Time - Non-Cancer	9125	days	USEPA, December 1989	

TABLE 4.2.RME - CURRENT/FUTURE SOIL EXPOSURE
VALUES USED FOR DAILY INTAKE CALCULATIONS
REASONABLE MAXIMUM EXPOSURE
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Current/Future**
Medium:	**Surface Soil**
Exposure Medium:	**Surface Soil**

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name [1]
Dermal Contact	Outdoor Industrial Worker	Adult	Onsite Surface Soil	CS	Chemical Concentration in Soil	See Table 3.1.RME See Table 3.2.RME	mg/kg	See Table 3.1	Dermally Absorbed Dose (DAD) (mg/kg/day) = Da_{event} x EF x ED x EV x SA x 1/BW x 1/AT where Da_{event} = CS x CF x AF x ABS
				CF	Conversion Factor	1.00E-06	kg/mg	NA	
				AF	Adherence Factor of Soil to Skin	0.1	mg/cm^2	95th percentile, USEPA, July 2004	
				ABS	Dermal Absorption Fraction	Chemical-Specific See Section 6.2.2	unitless	USEPA, July 2004	
				EF	Exposure Frequency	225	days/yr	Outdoor Worker, USEPA, December 2002	
				ED	Exposure Duration	25	yr	USEPA, December 1989	
				EV	Event Frequency	1	event/day	USEPA, July 2004	
				SA	Skin Surface Area Available for Contact	3300	cm^2	USEPA, July 2004	
				BW	Body Weight	80	kg	USEPA, September 2011	
				AT-C	Averaging Time - Cancer	28470	days	USEPA, September 2011	
				AT-N	Averaging Time - Non-Cancer	9125	days	USEPA, December 1989	
Inhalation	Outdoor Industrial Worker	Adult	Onsite Surface Soil	CS	Chemical Concentration in Soil	See Table 3.1.RME See Table 3.2.RME	mg/kg	See Table 3.1	Intake (mg/kg-day) = CS x IR x CF x ET x EF x ED x (1/VF + 1/PEF) x 1/BW x 1/AT
				EF	Exposure Frequency	225	days/yr	Outdoor Worker, USEPA, December 2002	
				ED	Exposure Duration	25	yr	USEPA, December 1989	
				ET	Exposure Time	8	hr/day	Assumed	
				IR	Inhalation Rate	1.60E-02	m^3/min	USEPA, 2011	
				CF	Conversion Factor	60	min/hr	NA	
				BW	Body Weight	80	kg	USEPA, September 2011	
				VF	Volatilization Factor	Chemical-specific	m^3/kg	USEPA, November 2013	
				PEF	Particulate Emission Factor	1.40E+09	m^3/kg	USEPA, November 2013	
				BW	Body Weight	80	kg	USEPA, September 2011	
				AT-C	Averaging Time - Cancer	28470	days	USEPA, September 2011	
				AT-N	Averaging Time - Non-Cancer	9125	days	USEPA, December 1989	

USEPA, December 1989. Risk Assessment Guidance for Superfund - Volume I - Human Health Evaluation Manual (Part A). EPA/540/1-89/002
USEPA, December 2002. Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24
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USEPA, September 2011. Exposure Factors Handbook: 2011 Edition. EPA/600/R-090/052F
USEPA, November 2013. User's Guide - Regional Screening Table. <http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/index.htm>

TABLE 4.3.CT - FUTURE SOIL EXPOSURE
VALUES USED FOR DAILY INTAKE CALCULATIONS
CENTRAL TENDENCY
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Future**
Medium:	**Surface and Subsurface Soil**
Exposure Medium:	**Surface and Subsurface Soil**

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference [1]	Intake Equation/ Model Name [1]
Ingestion	Construction Worker	Adult	Onsite Soil	CS	Chemical Concentration in Soil	See Table 3.3.CT See Table 3.4.CT	mg/kg	NA	Intake (mg/kg/day) = CS x IR_s x CF x FI x EF x ED x 1/BW x 1/AT
				IR_s	Soil Ingestion Rate	100	mg soil/day	USEPA, November 2013	
				CF	Conversion Factor	1.00E-06	kg/mg	NA	
				FI	Fraction Ingested from Source	1	unitless	Conservative Assumption	
				EF	Exposure Frequency	60	days/yr	Assumes 12 week project duration	
				ED	Exposure Duration	1	yr	Assumes 1 year project duration	
				BW	Body Weight	80	kg	USEPA, September 2011	
				AT-C	Averaging Time - Cancer	28470	days	USEPA, September 2011	
				AT-N	Averaging Time - Non-Cancer	365	days	USEPA, December 1989	
Dermal Contact	Construction Worker	Adult	Onsite Soil	CS	Chemical Concentration in Soil	See Table 3.3.CT See Table 3.4.CT	mg/kg	NA	Dermally Absorbed Dose (DAD) (mg/kg/day) = CS x CF x AF x ABS x EF x ED x EV x SA x 1/BW x 1/AT
				CF	Conversion Factor	1.00E-06	kg/mg	NA	
				AF	Adherence Factor of Soil to Skin	0.2	mg/cm^2	Geometric Mean for Construction and Utility Workers, USEPA, July 2004	
				ABS	Dermal Absorption Fraction	Chemical-Specific See Section 6.2.2	unitless	USEPA, July 2004	
				EF	Exposure Frequency	60	days/yr	Assumes 12 week project duration	
				ED	Exposure Duration	1	yr	Assumes 1 year project duration	
				EV	Event Frequency	1	event/day	USEPA, July 2004	
				SA	Skin Surface Area Available for Contact	557	cm^2	USEPA, September 2011	
				BW	Body Weight	80	kg	USEPA, September 2011	
				AT-C	Averaging Time - Cancer	28470	days	USEPA, September 2011	
				AT-N	Averaging Time - Non-Cancer	365	days	USEPA, December 1989	

TABLE 4.3.CT - FUTURE SOIL EXPOSURE
VALUES USED FOR DAILY INTAKE CALCULATIONS
CENTRAL TENDENCY
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Future**
Medium:	**Surface and Subsurface Soil**
Exposure Medium:	**Surface and Subsurface Soil**

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference [1]	Intake Equation/ Model Name [1]
Inhalation	Construction Worker	Adult	Onsite Soil	CS	Chemical Concentration in Soil	See Table 3.3.CT See Table 3.4.CT	mg/kg	NA	Intake (mg/kg-day) = CS x IR x CF x ET x EF x ED x (1/VF + 1/PEF) x 1/BW x 1/AT
				EF	Exposure Frequency	60	days/yr	Assumes 12 week project duration	
				ED	Exposure Duration	1	yr	Assumes 1 year project duration	
				ET	Exposure Time	8	hr/day	Assumed	
				IR	Inhalation Rate	2.70E-02	m^3/min	Mean, moderate intensity activity, USEPA, September 2011	
				CF	Conversion Factor	60	min/hr	NA	
				BW	Body Weight	80	kg	USEPA, September 2011	
				VF	Volatilization Factor	Chemical-specific	m^3/kg	USEPA, November 2013	
				PEF	Particulate Emission Factor	1.40E+09	m^3/kg	USEPA, November 2013	
				AT-C	Averaging Time - Cancer	28470	days	USEPA,September 2011	
				AT-N	Averaging Time - Non-Cancer	365	kg	USEPA, December 1989	
Ingestion	Utility Worker	Adult	Onsite Soil	CS	Chemical Concentration in Soil	See Table 3.3.CT See Table 3.4.CT	mg/kg	NA	Intake (mg/kg/day) = CS x IR_s x CF x FI x EF x ED x 1/BW x 1/AT
				IR_s	Soil Ingestion Rate	100	mg soil/day	USEPA, November 2013	
				CF	Conversion Factor	1.00E-06	kg/mg	NA	
				FI	Fraction Ingested from Source	1	unitless	Conservative Assumption	
				EF	Exposure Frequency	20	days/yr	Assumes 4 week project duration	
				ED	Exposure Duration	1	yr	Assumes 1 year project duration	
				BW	Body Weight	80	kg	USEPA, September 2011	
				AT-C	Averaging Time - Cancer	28470	days	USEPA, September 2011	
				AT-N	Averaging Time - Non-Cancer	365	days	USEPA, December 1989	

TABLE 4.3.CT - FUTURE SOIL EXPOSURE
VALUES USED FOR DAILY INTAKE CALCULATIONS
CENTRAL TENDENCY
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Future**
Medium:	**Surface and Subsurface Soil**
Exposure Medium:	**Surface and Subsurface Soil**

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference [1]	Intake Equation/ Model Name [1]
Dermal Contact	Utility Worker	Adult	Onsite Soil	CS	Chemical Concentration in Soil	See Table 3.3.CT See Table 3.4.CT	mg/kg	NA	Dermally Absorbed Dose (DAD) (mg/kg/day) = CS x CF x AF x ABS x EF x ED x EV x SA x 1/BW x 1/AT
				CF	Conversion Factor	1.00E-06	kg/mg	NA	
				AF	Adherence Factor of Soil to Skin	0.2	mg/cm^2	Geometric Mean for Construction and Utility Workers, USEPA, July 2004	
				ABS	Dermal Absorption Fraction	Chemical-Specific See Section 6.2.2	unitless	USEPA, July 2004	
				EF	Exposure Frequency	20	days/yr	Assumes 4 week project duration	
				ED	Exposure Duration	1	yr	Assumes 1 year project duration	
				EV	Event Frequency	1	event/day	USEPA, July 2004	
				SA	Skin Surface Area Available for Contact	3300	cm^2	USEPA, July 2004	
				BW	Body Weight	80	kg	USEPA, September 2011	
				AT-C	Averaging Time - Cancer	28470	days	USEPA, September 2011	
				AT-N	Averaging Time - Non-Cancer	365	days	USEPA, December 1989	
Inhalation	Utility Worker	Adult	Onsite Soil	CS	Chemical Concentration in Soil	See Table 3.3.CT See Table 3.4.CT	mg/kg	NA	Intake (mg/kg-day) = CS x IR x CF x ET x EF x ED x (1/VF + 1/PEF) x 1/BW x 1/AT
				EF	Exposure Frequency	20	days/yr	Assumes 4 week project duration	
				ED	Exposure Duration	1	yr	Assumes 1 year project duration	
				ET	Exposure Time	8	hr/day	Assumed	
				IR	Inhalation Rate	2.70E-02	m^3/min	Mean, moderate intensity activity, USEPA, September 2011	
				CF	Conversion Factor	60	min/hr	NA	
				BW	Body Weight	80	kg	USEPA, September 2011	
				VF	Volatilization Factor	Chemical-specific	m^3/kg	USEPA, November 2013	
				PEF	Particulate Emission Factor	1.40E+09	m^3/kg	USEPA, November 2013	
				AT-C	Averaging Time - Cancer	28470	days	USEPA,September 2011	
				AT-N	Averaging Time - Non-Cancer	365	kg	USEPA, December 1989	

USEPA, December 1989. Risk Assessment Guidance for Superfund - Volume I - Human Health Evaluation Manual (Part A). EPA 540/1-89/002
USEPA, December 2002. Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24
USEPA, July 2004. Risk Assessment Guidance for Superfund - Volume I - Human Health Evaluation Manual (Part E). EPA 540/1-89/002
USEPA, September 2011. Exposure Factors Handbook: 2011 Edition. EPA/600/R-090/052F
USEPA, November 2013. User's Guide - Regional Screening Table. <http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/index.htm>

TABLE 4.4.RME - FUTURE SOIL EXPOSURE
VALUES USED FOR DAILY INTAKE CALCULATIONS
REASONABLE MAXIMUM EXPOSURE
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Future**
Medium:	**Surface and Subsurface Soil**
Exposure Medium:	**Surface and Subsurface Soil**

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name [1]
Ingestion	Construction Worker	Adult	On-site Soil	CS	Chemical Concentration in Soil	See Table 3.3.RME See Table 3.4.RME	mg/kg	NA	Intake (mg/kg/day) = $CS \times IR_s \times CF \times FI \times EF \times ED \times 1/BW \times 1/AT$
				IR_s	Soil Ingestion Rate	330	mg soil/day	USEPA December 2002	
				CF	Conversion Factor	1.00E-06	kg/mg	NA	
				FI	Fraction Ingested from Source	1	unitless	Conservative Assumption	
				EF	Exposure Frequency	130	days/yr	Assumes 6 month construction period	
				ED	Exposure Duration	1	yr	Assumes 1 year project duration	
				BW	Body Weight	80	kg	USEPA, September 2011	
				AT-C	Averaging Time - Cancer	28470	days	USEPA, September 2011	
				AT-N	Averaging Time - Non-Cancer	365	days	USEPA, December 1989	
Dermal Contact	Construction Worker	Adult	On-site Soil	CS	Chemical Concentration in Soil	See Table 3.3.RME See Table 3.4.RME	mg/kg	NA	Dermally Absorbed Dose (DAD) (mg/kg/day) = $Da_{event} \times EF \times ED \times EV \times SA \times 1/BW \times 1/AT$ where $Da_{event} = CS \times CF \times AF \times ABS$
				CF	Conversion Factor	1.00E-06	kg/mg	NA	
				AF	Adherence Factor of Soil to Skin	0.8	mg/cm^2	95th percentile for construction and utility workers, USEPA, July 2004	
				ABS	Dermal Absorption Fraction	Chemical-Specific See Section 6.2.2	unitless	USEPA, July 2004	
				EF	Exposure Frequency	130	days/yr	Assumes 6 month construction period	
				ED	Exposure Duration	1	yr	Assumes 1 year project duration	
				EV	Event Frequency	1	event/day	USEPA, July 2004	
				SA	Skin Surface Area Available for Contact	3300	cm^2	USEPA, July 2004	
				BW	Body Weight	80	kg	USEPA, September 2011	
				AT-C	Averaging Time - Cancer	28470	days	USEPA, September 2011	
				AT-N	Averaging Time - Non-Cancer	365	days	USEPA, December 1989	

TABLE 4.4.RME - FUTURE SOIL EXPOSURE
VALUES USED FOR DAILY INTAKE CALCULATIONS
REASONABLE MAXIMUM EXPOSURE
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Future**
Medium:	**Surface and Subsurface Soil**
Exposure Medium:	**Surface and Subsurface Soil**

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name [1]
Inhalation	Construction Worker	Adult	On-site Soil	CS	Chemical Concentration in Soil	See Table 3.3.RME See Table 3.4.RME	mg/kg	NA	Intake (mg/kg-day) = CS x IR x CF x ET x EF x ED x (1/VF + 1/PEF) x 1/BW x 1/AT
				EF	Exposure Frequency	130	days/yr	Assumes 6 month construction period	
				ED	Exposure Duration	1	yr	Assumes 1 year project duration	
				ET	Exposure Time	8	hr/day	Assumed	
				IR	Inhalation Rate	3.80E-02	m^3/min	95th percentile, moderate intensity activity, USEPA, September 2011	
				CF	Conversion Factor	60	min/hr	NA	
				VF	Volatilization Factor	Chemical-specific	m^3/kg	USEPA, November 2013	
				PEF	Particulate Emission Factor	1.40E+09	m^3/kg	USEPA, November 2013	
				BW	Body Weight	80	kg	USEPA, September 2011	
				AT-C	Averaging Time - Cancer	27375	days	USEPA, September 2011	
				AT-N	Averaging Time - Non-Cancer	365	days	USEPA, December 1989	
Ingestion	Utility Worker	Adult	On-site Soil	CS	Chemical Concentration in Soil	See Table 3.3.RME See Table 3.4.RME	mg/kg	NA	Intake (mg/kg/day) = CS x IR_s x CF x FI x EF x ED x 1/BW x 1/AT
				IR_s	Soil Ingestion Rate	330	mg soil/day	USEPA December 2002	
				CF	Conversion Factor	1.00E-06	kg/mg	NA	
				FI	Fraction Ingested from Source	1	unitless	Conservative Assumption	
				EF	Exposure Frequency	40	days/yr	Assumes 8 week construction period	
				ED	Exposure Duration	1	yr	Assumes 1 year project duration	
				BW	Body Weight	80	kg	USEPA, September 2011	
				AT-C	Averaging Time - Cancer	28470	days	USEPA, September 2011	
				AT-N	Averaging Time - Non-Cancer	365	days	USEPA, December 1989	

TABLE 4.4.RME - FUTURE SOIL EXPOSURE
VALUES USED FOR DAILY INTAKE CALCULATIONS
REASONABLE MAXIMUM EXPOSURE
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Future**
Medium:	**Surface and Subsurface Soil**
Exposure Medium:	**Surface and Subsurface Soil**

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name [1]
Dermal Contact	Utility Worker	Adult	On-site Soil	CS	Chemical Concentration in Soil	See Table 3.3.RME See Table 3.4.RME	mg/kg	NA	Dermally Absorbed Dose (DAD) (mg/kg/day) = Da_{event} x EF x ED x EV x SA x 1/BW x 1/AT where Da_{event} = CS x CF x AF x ABS
				CF	Conversion Factor	1.00E-06	kg/mg	NA	
				AF	Adherence Factor of Soil to Skin	0.8	mg/cm^2	95th percentile for construction and utility workers, USEPA, July 2004	
				ABS	Dermal Absorption Fraction	Chemical-Specific See Section 6.2.2	unitless	USEPA, July 2004	
				EF	Exposure Frequency	40	days/yr	Assumes 8 week construction period	
				ED	Exposure Duration	1	yr	Assumes 1 year project duration	
				EV	Event Frequency	1	event/day	USEPA, July 2004	
				SA	Skin Surface Area Available for Contact	3300	cm^2	USEPA, July 2004	
				BW	Body Weight	80	kg	USEPA, September 2011	
				AT-C	Averaging Time - Cancer	28470	days	USEPA, September 2011	
				AT-N	Averaging Time - Non-Cancer	365	days	USEPA, December 1989	
Inhalation	Utility Worker	Adult	On-site Soil	CS	Chemical Concentration in Soil	See Table 3.3.RME See Table 3.4.RME	mg/kg	NA	Intake (mg/kg-day) = CS x IR x CF x ET x EF x ED x (1/VF + 1/PEF) x 1/BW x 1/AT
				EF	Exposure Frequency	40	days/yr	Assumes 8 week construction period	
				ED	Exposure Duration	1	yr	Assumes 1 year project duration	
				ET	Exposure Time	8	hr/day	Assumed	
				IR	Inhalation Rate	3.80E-02	m^3/min	95th percentile, moderate intensity activity, USEPA, September 2011	
				CF	Conversion Factor	60	min/hr	NA	
				VF	Volatilization Factor	Chemical-specific	m^3/kg	USEPA, November 2013	
				PEF	Particulate Emission Factor	1.40E+09	m^3/kg	USEPA, November 2013	
				BW	Body Weight	80	kg	USEPA, September 2011	
				AT-C	Averaging Time - Cancer	27375	days	USEPA, September 2011	
				AT-N	Averaging Time - Non-Cancer	365	days	USEPA, December 1989	

USEPA, December 1989. Risk Assessment Guidance for Superfund - Volume I - Human Health Evaluation Manual (Part A). EPA 540/1-89/002
USEPA, December 2002. Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24
USEPA, July 2004. Risk Assessment Guidance for Superfund - Volume I - Human Health Evaluation Manual (Part E). EPA 540/1-89/002
USEPA, September 2011. Exposure Factors Handbook: 2011 Edition. EPA/600/R-090/052F
USEPA, November 2013. User's Guide - Regional Screening Table. <http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/index.htm>

TABLE 4.5.CT- FUTURE GROUNDWATER EXPOSURE
VALUES USED FOR DAILY INTAKE CALCULATIONS
CENTRAL TENDENCY
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Future**
Medium:	**Groundwater**
Exposure Medium:	**Groundwater**

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name (1)
Ingestion	Construction Worker	Adult	Groundwater	CW	Chemical Concentration in Groundwater	See Table 3.6.CT	mg/L	NA	Intake (mg/kg/day) = CW x IR x EF x ED x 1/BW x 1/AT
				IR_w	Ingestion Rate	0.09	L/day	Assume 10% of the Mean water ingestion rate, USEPA, September 2011	
				EF	Exposure Frequency	60	days/yr	Assumes 12 week project duration	
				ED	Exposure Duration	1	yr	Assumes 1 year project duration	
				BW	Body Weight	80	kg	USEPA, September 2011	
				AT-C	Averaging Time - Cancer	28470	days	USEPA, September 2011	
				AT-N	Averaging Time - Non-Cancer	365	days	USEPA, December 1989	
Dermal	Construction Worker	Adult	Groundwater	Da_{event}	Absorbed Dose per Event	Calculated	mg/cm^2-event	USEPA, July 2004	Absorbed Dose (mg/kg/day) = Da_{event} x SA x EV x EF x ED x 1/BW x 1/AT
				CW	Chemical Concentration in Groundwater	See Table 3.6.CT	mg/L	NA	
				SA	Skin Surface Area	3300	cm^2	USEPA, July 2004	
				EV	Event Frequency	1	events/day	USEPA, July 2004	
				EF	Exposure Frequency	60	days/yr	Assumes 12 week project duration	
				ED	Exposure Duration	1	yr	Assumes 1 year project duration	
				BW	Body Weight	80	kg	USEPA, September 2011	
				AT-C	Averaging Time - Cancer	28470	days	USEPA, September 2011	If $t_{event} \leq t^*$, then DA_{event} = 2FA x K_p x CW x SQRT(6τevent x tevent/π)
				AT-N	Averaging Time - Non-Cancer	365	days	USEPA, December 1989	
				FA	Fraction Absorbed from Water	1	unitless	USEPA, July 2004	
				K_p	Dermal Permeability Coefficient	Chemical-Specific	cm/hr	USEPA, July 2004	
				CW	Chemical Concentration in Water	Calculated	mg/cm^3	NA	If $t_{event} > t^*$, then DA_{event} = FA x K_p x CW x [tevent/(1+B) 2τevent ((1 + 3B + 3B2)/(1 + B)2)
				τ_{event}	Lag time per event	Chemical-Specific	hours	USEPA, July 2004	
				t_{event}	Event Duration	8	hours	Assume 8 hours/day	
				t*	Time to Reach Steady-State	2.4 x τ_{event}	hours	USEPA, July 2004	
				B	Ratio of Permeability Coefficient through Stratum Corneum to Permeability Coefficient through Epidermis	Chemical-Specific	unitless	USEPA, July 2004	

TABLE 4.5.CT- FUTURE GROUNDWATER EXPOSURE
VALUES USED FOR DAILY INTAKE CALCULATIONS
CENTRAL TENDENCY
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Future**
Medium:	**Groundwater**
Exposure Medium:	**Groundwater**

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name (1)
Ingestion	Utility Worker	Adult	Groundwater	CW	Chemical Concentration in Groundwater	See Table 3.6.CT	mg/L	NA	Intake (mg/kg/day) = CW x IR x EF x ED x 1/BW x 1/AT
				IR_w	Ingestion Rate	0.09	L/day	Assume 10% of the Mean water ingestion rate, USEPA, September 2011	
				EF	Exposure Frequency	20	days/yr	Assumes 4 week project duration	
				ED	Exposure Duration	1	yr	Assumes 1 year project duration	
				BW	Body Weight	80	kg	USEPA, September 2011	
				AT-C	Averaging Time - Cancer	28470	days	USEPA, September 2011	
				AT-N	Averaging Time - Non-Cancer	365	days	USEPA, December 1989	
Dermal	Utility Worker	Adult	Groundwater	Da_{event}	Absorbed Dose per Event	Calculated	mg/cm^2-event	USEPA, July 2004	Absorbed Dose (mg/kg/day) = Da_{event} x SA x EV x EF x ED x 1/BW x 1/AT
				CW	Chemical Concentration in Groundwater	See Table 3.6.CT	mg/L	NA	
				SA	Skin Surface Area	3300	cm^2	USEPA, July 2004	
				EV	Event Frequency	1	events/day	USEPA, July 2004	
				EF	Exposure Frequency	20	days/yr	Assumes 4 week project duration	
				ED	Exposure Duration	1	yr	Assumes 1 year project duration	
				BW	Body Weight	80	kg	USEPA, September 2011	
				AT-C	Averaging Time - Cancer	28470	days	USEPA, September 2011	If $t_{event} \le t^*$, then DA_{event} = 2FA x K_p x CW x SQRT(6τevent x tevent/π)
				AT-N	Averaging Time - Non-Cancer	365	days	USEPA, December 1989	
				FA	Fraction Absorbed from Water	1	unitless	USEPA, July 2004	
				K_p	Dermal Permeability Coefficient	Chemical-Specific	cm/hr	USEPA, July 2004	
				CW	Chemical Concentration in Water	Calculated	mg/cm^3	NA	If $t_{event} > t^*$, then DA_{event} = FA x K_p x CW x [tevent/(1+B) 2τevent ((1 + 3B + 3B2)/(1 + B)2)
				τ_{event}	Lag time per event	Chemical-Specific	hours	USEPA, July 2004	
				t_{event}	Event Duration	2	hours	Professional judgment	
				t*	Time to Reach Steady-State	2.4 x τ_{event}	hours	USEPA, July 2004	
				B	Ratio of Permeability Coefficient through Stratum Corneum to Permeability Coefficient through Epidermis	Chemical-Specific	unitless	USEPA, July 2004	

USEPA, December 1989. Risk Assessment Guidance for Superfund - Volume I - Human Health Evaluation Manual (Part A). EPA/540/1-89/002
USEPA, July 2004. Risk Assessment Guidance for Superfund - Volume I - Human Health Evaluation Manual (Part E). EPA/540/1-89/002
USEPA, September 2011. Exposure Factors Handbook: 2011 Edition. EPA/600/R-090/052F

TABLE 4.6.RME - FUTURE GROUNDWATER EXPOSURE
VALUES USED FOR DAILY INTAKE CALCULATIONS
REASONABLE MAXIMUM EXPOSURE
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Future**
Medium:	**Groundwater**
Exposure Medium:	**Groundwater**

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name [1]
Ingestion	Construction Worker	Adult	Groundwater	CW	Chemical Concentration in Groundwater	See Table 3.6.RME	mg/L	NA	Intake (mg/kg/day) = CW x IR_w x EF x ED x 1/BW x 1/AT
				IR_w	Ingestion Rate	0.27	L/day	Assume 10% of the 95th percentile ingestion rate, USEPA, September 2011	
				EF	Exposure Frequency	130	days/yr	Assumes 6 month construction period	
				ED	Exposure Duration	1	yr	Assumes 1 year project duration	
				BW	Body Weight	80	kg	USEPA, September 2011	
				AT-C	Averaging Time - Cancer	28470	days	USEPA, September 2011	
				AT-N	Averaging Time - Non-Cancer	365	days	USEPA, December 1989	
Dermal	Construction Worker	Adult	Groundwater	Da_{event}	Absorbed Dose per Event	Calculated	mg/cm^2-event	USEPA, July 2004	Absorbed Dose (mg/kg/day) = Da_{event} x SA x EV x EF x ED x 1/BW x 1/AT
				CW	Chemical Concentration in Water	See Table 3.6.RME	mg/cm^3	NA	
				SA	Skin Surface Area	3300	cm^2	USEPA, July 2004	
				EV	Event Frequency	1	events/day	USEPA, July 2004	
				EF	Exposure Frequency	130	days/yr	Assumes 6 month construction period	
				ED	Exposure Duration	1	yr	Assumes 1 year project duration	
				BW	Body Weight	80	kg	USEPA, September 2011	
				AT-C	Averaging Time - Cancer	28470	days	USEPA, September 2011	If $t_{event} \leq t^*$, then Da_{event} = 2FA x K_p x CW x SQRT(6τevent x tevent/π)
				AT-N	Averaging Time - Non-Cancer	365	days	USEPA, December 1989	
				FA	Fraction Absorbed from Water	1	unitless	USEPA, July 2004	
				K_p	Dermal Permeability Coefficient	Chemical-Specific	cm/hr	USEPA, July 2004	
				τ_{event}	Lag time per event	Chemical-Specific	hours	USEPA, July 2004	If $t_{event} > t^*$, then Da_{event} = FA x K_p x CW x [tevent/(1+B) 2τevent ((1 + 3B + 3B2)/(1 + B)2)
				t_{event}	Event Duration	8	hours	Assume 8 hours/day	
				t*	Time to Reach Steady-State	2.4 x τ_{event}	hours	USEPA, July 2004	
				B	Ratio of Permeability Coefficient through Stratum Corneum to Permeability Coefficient through Epidermis	Chemical-Specific	unitless	USEPA, July 2004	

TABLE 4.6.RME - FUTURE GROUNDWATER EXPOSURE
VALUES USED FOR DAILY INTAKE CALCULATIONS
REASONABLE MAXIMUM EXPOSURE
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Future**
Medium:	**Groundwater**
Exposure Medium:	**Groundwater**

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name (1)
Ingestion	Utility Worker	Adult	Groundwater	CW	Chemical Concentration in Groundwater	See Table 3.6.RME	mg/L	NA	Intake (mg/kg/day) = $CW \times IR_w \times EF \times ED \times 1/BW \times 1/AT$
				IR_w	Ingestion Rate	0.27	L/day	Assume 10% of the 95th percentile ingestion rate, USEPA, September 2011	
				EF	Exposure Frequency	40	days/yr	Assumes 8 week construction period	
				ED	Exposure Duration	1	yr	Assumes 1 year project duration	
				BW	Body Weight	80	kg	USEPA, September 2011	
				AT-C	Averaging Time - Cancer	28470	days	USEPA, September 2011	
				AT-N	Averaging Time - Non-Cancer	365	days	USEPA, December 1989	
Dermal	Utility Worker	Adult	Groundwater	Da_{event}	Absorbed Dose per Event	Calculated	mg/cm^2-event	USEPA, July 2004	Absorbed Dose (mg/kg/day) = $Da_{event} \times SA \times EV \times EF \times ED \times 1/BW \times 1/AT$
				CW	Chemical Concentration in Water	See Table 3.6.RME	mg/cm^3	NA	
				SA	Skin Surface Area	3300	cm^2	USEPA, July 2004	
				EV	Event Frequency	1	events/day	USEPA, July 2004	
				EF	Exposure Frequency	40	days/yr	Assumes 8 week construction period	
				ED	Exposure Duration	1	yr	Assumes 1 year project duration	
				BW	Body Weight	80	kg	USEPA, September 2011	
				AT-C	Averaging Time - Cancer	28470	days	USEPA, September 2011	If $t_{event} \leq t^*$, then $Da_{event} = 2FA \times K_p \times CW \times SQRT(6\tau event \times tevent/\pi)$
				AT-N	Averaging Time - Non-Cancer	365	days	USEPA, December 1989	
				FA	Fraction Absorbed from Water	1	unitless	USEPA, July 2004	
				K_p	Dermal Permeability Coefficient	Chemical-Specific	cm/hr	USEPA, July 2004	
				τ_{event}	Lag time per event	Chemical-Specific	hours	USEPA, July 2004	If $t_{event} > t^*$, then $Da_{event} = FA \times K_p \times CW$
				t_{event}	Event Duration	2	hours	Professional judgment	$\times [tevent/(1+B)\ 2\tau event\ ((1 + 3B + 3B2)/(1 + B)2)$
				t*	Time to Reach Steady-State	$2.4 \times \tau_{event}$	hours	USEPA, July 2004	
				B	Ratio of Permeability Coefficient through Stratum Corneum to Permeability Coefficient through Epidermis	Chemical-Specific	unitless	USEPA, July 2004	

USEPA, December 1989. Risk Assessment Guidance for Superfund - Volume I - Human Health Evaluation Manual (Part A). EPA/540/1-89/002
USEPA, July 2004. Risk Assessment Guidance for Superfund - Volume I - Human Health Evaluation Manual (Part E). EPA/540/1-89/002
USEPA, September 2011. Exposure Factors Handbook: 2011 Edition. EPA/600/R-090/052F

TABLE 4.7.CT - FUTURE INDOOR AIR EXPOSURE
VALUES USED FOR DAILY INTAKE CALCULATIONS
CENTRAL TENDENCY
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Future**
Medium:	**Indoor Air**
Exposure Medium:	**Indoor Air**

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name (1)
Inhalation	Indoor Worker	Adult	Indoor Air	CA	Chemical Concentration in Air	Estimated using Johnson&Ettinger	mg/m^3	NA	Intake (mg/kg-day) = CS x IR x CF x ET x EF x ED x (1/VF + 1/PEF) x 1/BW x 1/AT
				EF	Exposure Frequency	250	days/year	USEPA, December 1989	
				ED	Exposure Duration	5	yr	Average job tenure, Bureau of Labor Statistics, 2012	
				ET	Exposure Time	8	hr/day	Assumed	
				IR	Inhalation Rate	1.20E-02	m^3/min	mean, light intensity activity, USEPA, September 2011	
				CF	Conversion Factor	60	min/hr	NA	
				BW	Body Weight	80	kg	USEPA, September 2011	
				AT-C	Averaging Time - Cancer	28470	days	USEPA, September 2011	
				AT-N	Averaging Time - Non-Cancer	1825	days	USEPA,December 1989	

Bureau of Labor Statistics, 2012. Employer Tenure Summary, http://www.bls.gov/news.release/tenure.nr0.htm
USEPA, December 1989. Risk Assessment Guidance for Superfund - Volume I - Human Health Evaluation Manual (Part A). EPA 540/1-89/002
USEPA, September 2011. Exposure Factors Handbook: 2011 Edition. EPA/600/R-090/052F

TABLE 4.8.RME - FUTURE INDOOR AIR EXPOSURE
VALUES USED FOR DAILY INTAKE CALCULATIONS
REASONABLE MAXIMUM EXPOSURE
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Future**
Medium:	**Indoor Air**
Exposure Medium:	**Indoor Air**

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name (1)
Inhalation	Indoor Worker	Adult	Indoor Air	CA	Chemical Concentration in Air	Estimated using Johnson&Ettinger	mg/m^3	NA	Intake (mg/kg-day) = CS x IR x CF x ET x EF x ED x (1/VF + 1/PEF) x 1/BW x 1/AT
				EF	Exposure Frequency	250	days/yr	USEPA, December 2002	
				ED	Exposure Duration	25	yr	USEPA, December 1989	
				ET	Exposure Time	8	hr/day	Assumed	
				IR	Inhalation Rate	1.20E-02	m^3/min	mean, light intensity activity, USEPA, September 2011	
				CF	Conversion Factor	60	min/hr	NA	
				BW	Body Weight	80	kg	USEPA, September 2011	
				AT-C	Averaging Time - Cancer	28470	days	USEPA, September 2011	
				AT-N	Averaging Time - Non-Cancer	9125	days	USEPA,December 1989	

USEPA, December 1989. Risk Assessment Guidance for Superfund - Volume I - Human Health Evaluation Manual (Part A). EPA 540/1-89/002
USEPA, December 2002. Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24
USEPA, September 2011. Exposure Factors Handbook: 2011 Edition. EPA/600/R-090/052F

TA[illegible].1
NON-CANCER TOXICITY DATA - ORAL/DERMAL
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Chemical of Potential Concern	Chronic/ Subchronic [1]	Oral RfD		Oral Absorption Efficiency for Dermal [2]	Absorbed RfD for Dermal [2]		Primary Target Organ(s)	Combined Uncertainty/Modifying Factors	RfD:Target Organ(s)	
		Value	Units		Value	Units			Source(s)	Date(s)
Volatile Organics										
1,2,4,5-Tetrachlorobenzene	C	3E-04	mg/kg/day	1	3E-04	mg/kg/day	kidney	1000	IRIS [3]	02/10/14
	SC	3E-05	mg/kg/day	1	3E-05	mg/kg/day	thyroid	300	PPRTV [4]	02/10/14
1,2,3-Trichlorobenzene	C	8E-04	mg/kg/day	1	8E-04	mg/kg/day	body weight	10	PPRTV	02/10/14
	SC	8E-03	mg/kg/day	1	8E-03	mg/kg/day	body weight/liver	1000	PPRTV	02/10/14
1,2,4-Trichlorobenzene	C	1E-02	mg/kg/day	1	1E-02	mg/kg/day	adrenal	1000	IRIS	02/10/14
	SC	9E-02	mg/kg/day	1	9E-02	mg/kg/day	liver	100	PPRTV	02/10/14
1,2-Dichlorobenzene	C	9E-02	mg/kg/day	1	9E-02	mg/kg/day	liver	1000	IRIS	02/10/14
	SC	6E-01	mg/kg/day	1	6E-01	mg/kg/day	liver	NA [5]	RAIS [6]	02/10/14
1,3-Dichlorobenzene [7]	C	9E-02	mg/kg/day	1	9E-02	mg/kg/day	liver	1000	IRIS	02/10/14
	SC	6E-01	mg/kg/day	1	6E-01	mg/kg/day	liver	NA	PPRTV	02/10/14
1,4-Dichlorobenzene	C	7E-02	mg/kg/day	1	7E-02	mg/kg/day	liver	NA	RSL [8]	11/01/13
1,2-Dichloropropane	C	9E-02	mg/kg/day	1	9E-02	mg/kg/day	NA	NA	RSL	11/01/13
Benzene	C	4E-03	mg/kg/day	1	4E-03	mg/kg/day	blood	300	IRIS	02/10/14
	SC	1E-02	mg/kg/day	1	1E-02	mg/kg/day	blood	100	RAIS	02/10/14
Chlorobenzene	C	2E-02	mg/kg/day	1	2E-02	mg/kg/day	liver	1000	IRIS	02/10/14
	SC	7E-02	mg/kg/day	1	7E-02	mg/kg/day	liver	300	PPRTV	02/10/14
Ethylbenzene	C	1E-01	mg/kg/day	1	1E-01	mg/kg/day	liver/kidney	1000	IRIS	02/10/14
	SC	5E-02	mg/kg/day	1	5E-02	mg/kg/day	liver	1000	PPRTV	02/10/14
Trichloroethene	C	5E-04	mg/kg/day	1	5E-04	mg/kg/day	thyroid/circulatory	100	IRIS	02/10/14
Xylenes	C	2E-01	mg/kg/day	1	2E-01	mg/kg/day	body weight	1000	IRIS	02/10/14
	SC	4E-01	mg/kg/day	1	4E-01	mg/kg/day	whole body	100	PPRTV	2/10/2014
Semivolatile Organics										
1,1'-Biphenyl	C	5E-01	mg/kg/day	1	5E-01	mg/kg/day	kidney	30	IRIS	02/10/14
	SC	1E-01	mg/kg/day	1	1E-01	mg/kg/day	fetus	100	PPRTV	02/10/14
2-Methylnaphthalene	C	4E-03	mg/kg/day	0.13	5E-04	mg/kg/day	respiratory	1000	IRIS	02/10/14
	SC	4E-03	mg/kg/day	0.13	5E-04	mg/kg/day	respiratory	NA	PPRTV	02/10/14
Benzo(a)anthracene	NA	NA	NA	0.13	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	NA	NA	NA	0.13	NA	NA	NA	NA	IRIS	02/26/14
Benzo(b)fluoranthene	NA	NA	NA	0.13	NA	NA	NA	NA	IRIS	02/26/14
Bis(2-ethylhexyl)phthalate	C	2E-02	mg/kg/day	0.10	2E-03	mg/kg/day	liver	1000	IRIS	02/26/14
Chrysene	NA	NA	NA	0.13	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	NA	NA	NA	0.13	NA	NA	NA	NA	NA	NA
Di-n-Octylphthalate	C	1E-02	mg/kg/day	0.10	1E-03	mg/kg/day	cytoplasm	3000	PPRTV	02/10/14
	SC	1E-01	mg/kg/day	0.10	1E-02	mg/kg/day	cytoplasm	300	PPRTV	02/10/14
Hexachlorobenzene	C	8E-04	mg/kg/day	0.1	8E-05	mg/kg/day	liver	100	IRIS	02/26/14
	SC	1E-05	mg/kg/day	0.1	1E-06	mg/kg/day	reproductive	300	PPRTV	02/26/14
Hexachlorobutadiene	C	1E-03	mg/kg/day	1	1E-03	mg/kg/day	kidney	100	PPRTV	02/26/14
	SC	1E-03	mg/kg/day	1	1E-03	mg/kg/day	kidney	100	PPRTV	02/26/14
Indeno(1,2,3-cd)pyrene	NA	NA	NA	0.13	NA	NA	NA	NA	NA	NA
Naphthalene	C	2E-02	mg/kg/day	0.13	3E-03	mg/kg/day	body weight	3000	IRIS	02/26/14
Pyrene	C	3E-02	mg/kg/day	0.13	4E-03	mg/kg/day	kidney	3000	IRIS	02/26/14
	SC	3E-01	mg/kg/day	0.13	4E-02	mg/kg/day	kidney	300	PPRTV	02/26/14

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NON-CANCER TOXICITY DATA - ORAL/DERMAL

STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE

KEARNY, NEW JERSEY

Chemical of Potential Concern	Chronic/ Subchronic (1)	Oral RfD		Oral Absorption Efficiency for Dermal (2)	Absorbed RfD for Dermal (2)		Primary Target Organ(s)	Combined Uncertainty/Modifying Factors	RfD:Target Organ(s)	
		Value	Units		Value	Units			Source(s)	Date(s)
PCBs										
Aroclor 1248	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor 1254	C	2E-05	mg/kg/day	0.14	3E-06	mg/kg/day	eyes/immune	300	IRIS	02/26/14
Aroclor 1260	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor 1268	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dioxin										
TCDD	C	7E-10	mg/kg/day	0.03	2E-11	mg/kg/day	reproductive	30	IRIS	02/26/14
Metals										
Aluminum	C	1E+00	mg/kg/day	1.00	1E+00	mg/kg/day	LOAEL (9)	1E+02	PPRTV	02/26/14
Antimony	C	4E-04	mg/kg/day	0.15	6E-05	mg/kg/day	lifespan/blood	1000	IRIS	02/26/14
	SC	4E-04	mg/kg/day	0.15	6E-05	mg/kg/day	whole body	1000	PPRTV	02/26/14
Arsenic	C	3E-04	mg/kg/day	0.03	9E-06	mg/kg/day	skin	3	IRIS	02/26/14
Barium	C	2E-01	mg/kg/day	0.07	1E-02	mg/kg/day	kidney	300	IRIS	02/26/14
Cadmium	C	1E-03	mg/kg/day	0.03	3E-05	mg/kg/day	kidney	10	IRIS	02/26/14
Chromium	C	1.5E+0	mg/kg/day	0.13	2E-01	mg/kg/day	NOAEL (9)	1000	IRIS	02/26/14
Chromium, hexavalent	C	3E-03	mg/kg/day	0.025	8E-05	mg/kg/day	NOAEL	900	IRIS	02/26/14
Cobalt	C	3E-04	mg/kg/day	1	3E-04	mg/kg/day	thyroid	3000	PPRTV	02/26/14
	SC	3E-03	mg/kg/day	1	3E-03	mg/kg/day	thyroid	300	PPRTV	02/26/14
Copper	C	4E-02	mg/kg/day	1	4E-02	mg/kg/day	NA	NA	RSL	02/26/14
Iron	C	7E-01	mg/kg/day	1	7E-01	mg/kg/day	gastrointestinal	1.5	PPRTV	02/26/14
	SC	7E-01	mg/kg/day	1	7E-01	mg/kg/day	gastrointestinal	1.5	RAIS	02/26/14
Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	C	1E-01	mg/kg/day	1	1E-01	mg/kg/day	central nervous	1	IRIS	02/26/14
Mercury	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nickel (11)	C	2E-02	mg/kg/day	1	2E-02	mg/kg/day	body weight	300	IRIS	02/26/14
Silver	C	5E-03	mg/kg/day	1	5E-03	mg/kg/day	skin	2E+00	IRIS	02/26/14
Vanadium	C	9E-03	mg/kg/day	0.03	2E-04	mg/kg/day	hair	100	PPRTV	02/26/14
	SC	7E-04	mg/kg/day	0.03	2E-05	mg/kg/day	kidney	300	RAIS	02/26/14
Thallium (11)	C	1E-05	mg/kg/day	1	1E-05	mg/kg/day	hair,eyes	3000	IRIS	02/26/14
	SC	4E-05	mg/kg/day	1	4E-05	mg/kg/day	hair,eyes	1000	PPRTV	02/26/14
Zinc	C	3E-01	mg/kg/day	1	3E-01	mg/kg/day	low copper status	3	IRIS	02/26/14

(1) In the absence of subchronic toxicity values, the chronic value is used to be conservative.
(2) USEPA, 2004. Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment). EPA/540/R/99/005 - chapter 4. See Section 6
(3) Integrated Risk Information System (IRIS) - USEPA, February 2014. <http://cfpub.epa.gov/ncea/iris/index.html>
(4) Provisional Peer Reviewed Toxicity Values for Superfund (PPRTV) - USEPA, 2014. http://hhpprtv.ornl.gov/
(5) NA - Not available
(6) Risk Assessment Information System (RAIS) - Oak Ridge National Laboratory - 2014. <http://rais.ornl.gov>
(7) Toxicity values for 1,2-dichlorobenzene are used for 1.3-dichlorobenzene
(8) Regional Screening Table (RSL) - USEPA, November 2013 <http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/index.htm>
(9) LOAEL - Lowest Observed Adverse Effect Level
(10) NOAEL - No Observed Adverse Effect Level
(11) Value presented for soluble salts

TABLE 5-2
NON-CANCER TOXICITY DATA - INHALATION
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Chemical of Potential Concern	Chronic/ Subchronic (1)	Inhalation RfC		Extrapolated RfD(2)		Primary Target Organ(s)	Combined Uncertainty/Modifying Factors	RfC : Target Organ(s)	
		Value	Units	Value	Units			Source(s)	Date(s)
Volatile Organics									
1,2,4,5-Tetrachlorobenzene	NA (3)	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3-Trichlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,4-Trichlorobenzene	C	2E-03	mg/m^3	5.71E-04	mg/kg-day	liver	100	PPRTV (4)	2/10/2014
	SC	2E-02	mg/m^3	5.71E-03	mg/kg-day	liver	300	PPRTV	2/10/2014
1,2-Dichlorobenzene	C	2E-01	mg/m^3	5.71E-02	mg/kg-day	liver	NA	RSL (5)	11/01/13
	SC	2E+00	mg/m^3	5.71E-01	mg/kg-day	liver	NA	RAIS (6)	2/10/2014
1,3-Dichlorobenzene (7)	C	2E-01	mg/m^3	5.71E-02	mg/kg-day	liver	NA	RSL	11/01/13
	SC	2E+00	mg/m^3	5.71E-01	mg/kg-day	liver	NA	RAIS	2/10/2014
1,4-Dichlorobenzene	C	8E-01	mg/m^3	2.29E-01	mg/kg-day	liver	100	IRIS (8)	2/10/2014
1,2-Dichloropropane	C	4E-03	mg/m^3	1.14E-03	mg/kg-day	nasal mucosa	300	IRIS	2/10/2014
Benzene	C	3E-02	mg/m^3	8.57E-03	mg/kg-day	blood	300	IRIS	2/10/2014
	SC	8E-02	mg/m^3	2.29E-02	mg/kg-day	liver	100	RAIS	2/10/2014
Chlorobenzene	C	5E-02	mg/m^3	1.43E-02	mg/kg-day	liver	1000	IRIS	2/10/2014
	SC	5E-01	mg/m^3	1.43E-01	mg/kg-day	liver	100	PPRTV	2/10/2014
Ethylbenzene	C	1E+00	mg/m^3	2.86E-01	mg/kg-day	developmental	300	IRIS	2/10/2014
	SC	9E+00	mg/m^3	2.57E+00	mg/kg-day	ear	100	PPRTV	2/10/2014
Trichloroethene	C	4E-04	mg/m^3	1.14E-04	mg/kg-day	thyroid/circulatory	100	IRIS	2/10/2014
Xylenes	C	1E-01	mg/m^3	2.86E-02	mg/kg-day	coordination	300	IRIS	2/10/2014
	SC	4E-01	mg/m^3	1.14E-01	mg/kg-day	whole body	100	PPRTV	2/10/2014
Semivolatile Organics									
1,1'-Biphenyl	C	4E-04	mg/m^3	1.14E-04	mg/kg-day	edema	NA	IRIS	2/10/2014
	SC	4E-03	mg/m^3	1.14E-03	mg/kg-day	edema	NA	PPRTV	2/10/2014
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bis(2-ethylhexyl)phthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Di-n-Octylphthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorobutadiene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	C	3E-03	mg/m^3	8.57E-04	mg/kg-day	respiratory	3000	IRIS	2/26/2014
Pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA

TABLE 5-2
NON-CANCER TOXICITY DATA - INHALATION
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Chemical of Potential Concern	Chronic/ Subchronic (1)	Inhalation RfC		Extrapolated RfD[2]		Primary Target Organ(s)	Combined Uncertainty/Modifying Factors	RfC : Target Organ(s)	
		Value	Units	Value	Units			Source(s)	Date(s)
PCBs									
Aroclor 1248	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor 1254	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor 1260	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor 1268 (6)	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dioxin									
TCDD	C	4E-08	mg/m^3	1.14E-08	mg/kg-day	NA	NA	RSL	11/01/13
Metals									
Aluminum	C	5E-03	mg/m^3	1.43E-03	mg/kg-day	neuro	NA	PPRTV	2/26/2014
Antimony	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	C	1.5E-05	mg/m^3	4.29E-06	mg/kg-day	NA	NA	RSL	11/01/13
Barium	C	5E-04	mg/m^3	1.43E-04	mg/kg-day	NA	NA	RSL	11/01/13
Cadmium	C	1E-05	mg/m^3	2.86E-06	mg/kg-day	NA	NA	RSL	11/01/13
Chromium	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium, hexavalent	C	1E-04	mg/m^3	2.86E-05	mg/kg-day	respiratory	300	IRIS	2/26/2014
Cobalt	C	6E-06	mg/m^3	1.71E-06	mg/kg-day	respiratory	300	PPRTV	2/26/2014
	SC	2E-05	mg/m^3	5.71E-06	mg/kg-day	respiratory	100	PPRTV	2/26/2014
Copper	NA	NA	NA	NA	NA	NA	NA	NA	NA
Iron	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	C	5E-05	mg/m^3	1.43E-05	mg/kg-day	central nervous	1000	IRIS	2/26/2014
Mercury	C	3E-04	mg/m^3	8.57E-05	mg/kg-day	central nervous	30	IRIS	2/26/2014
Nickel	C	9E-05	mg/m^3	2.57E-05	mg/kg-day	NA	NA	IRIS	2/26/2014
Silver	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	NA	NA	NA	NA	NA	NA	NA	NA	NA
Thallium	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	NA	NA	NA	NA	NA	NA	NA	NA	NA

(1) In the absence of subchronic toxicity values, the chronic value is used to be conservative.
(2) RfD (mg/kg-day) = RfC (mg/m^3) x 20 (m3/day) / 70 (kg)
(3) NA - Not available
(4) Provisional Peer Reviewed Toxicity Values for Superfund (PPRTV) - USEPA, 2014. http://hhpprtv.ornl.gov/
(5) Regional Screening Table (RSL) - USEPA, November 2013 <http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/index.htm>
(6) Risk Assessment Information System (RAIS) - Oak Ridge National Laboratory - 2014. <http://rais.ornl.gov>
(7) Toxicity values for 1,2-dichlorobenzene are used for 1.3-dichlorobenzene
(8) Integrated Risk Information System (IRIS) - USEPA, February 2014. <http://cfpub.epa.gov/ncea/iris/index.html>

TABLE 6.1
CANCER TOXICITY DATA -- ORAL/DERMAL
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Chemical of Potential Concern	Oral Cancer Slope Factor		Oral Absorption Efficiency for Dermal [1]	Absorbed Cancer Slope Factor for Dermal		Weight of Evidence/ Cancer Guideline Description	Oral CSF	
	Value	Units		Value	Units		Source(s)	Date(s)
Volatile Organics								
1,2,4,5-Tetrachlorobenzene	NA [3]	NA	1	NA	NA	Inadequate Information	PPRTV[2]	02/10/14
1,2,3-Trichlorobenzene	NA	NA	1	NA	NA	Inadequate Information	PPRTV	02/10/14
1,2,4-Trichlorobenzene	2.9E-02	kg-day/mg	1	2.90E-02	kg-day/mg	D - Not Classifiable	PPRTV	02/10/14
1,2-Dichlorobenzene	NA	NA	1	NA	NA	D - Not Classifiable	IRIS[4]	02/10/14
1,3-Dichlorobenzene	NA	NA	1	NA	NA	NA	NA	NA
1,4-Dichlorobenzene [5]	5.4E-03	kg-day/mg	1	5.40E-03	kg-day/mg	C- Possible Human Carcinogen	RSL [6]	11/01/13
1,2-Dichloropropane [5]	3.6E-02	kg-day/mg	1	3.60E-02	kg-day/mg	NA	NA	NA
Benzene	5.5E-02	kg-day/mg	1	5.50E-02	kg-day/mg	A - Known Human Carcinogen	IRIS	02/10/14
Chlorobenzene	NA	NA	1	NA	NA	D - Not Classifiable	IRIS	02/10/14
Ethylbenzene [5]	1.0E-02	kg-day/mg	1	1.00E-02	kg-day/mg	D - Not Classifiable	IRIS	02/10/14
Trichloroethene	4.6E-02	kg-day/mg	1	4.60E-02	kg-day/mg	Carcinogenic	IRIS	02/10/14
Xylenes	NA	NA	1	NA	NA	Inadequate Information	IRIS	02/10/14
Semivolatile Organics								
1,1'-Biphyenyl	8.0E-03	kg-day/mg	1	8.00E-03	kg-day/mg	Suggestive Evidence of Carcinogenicity	IRIS	02/10/14
2-Methylnaphthalene	NA	NA	NA	NA	NA	Inadequate Information	IRIS	02/10/14
Benzo(a)anthracene	7.3E-01	kg-day/mg	0.13	9.49E-02	kg-day/mg	B2 - Probable Human Carcinogen	RSL	11/01/13
Benzo(a)pyrene	7.3E+00	kg-day/mg	0.13	9.49E-01	kg-day/mg	B2 - Probable Human Carcinogen	IRIS	02/26/14
Benzo(b)fluoranthene	7.3E-01	kg-day/mg	0.13	9.49E-02	kg-day/mg	B2 - Probable Human Carcinogen	RSL	11/01/13
Bis (2-ethylhexyl)phthalate	1.4E-02	kg-day/mg	0.1	1.40E-03	kg-day/mg	B2 - Probable Human Carcinogen	IRIS	02/26/14
Chrysene	7.3E-03	kg-day/mg	0.13	9.49E-04	kg-day/mg	B2 - Probable Human Carcinogen	RSL	11/01/13
Dibenz(a,h)anthracene	7.3E+00	kg-day/mg	0.13	9.49E-01	kg-day/mg	B2 - Probable Human Carcinogen	RSL	11/01/13
Di-n-Octylphthalate	NA	NA	NA	NA	NA	Inadequate Information	PPRTV	02/10/14
Hexachlorobenzene	1.6E+00	kg-day/mg	0.1	1.60E-01	kg-day/mg	B2 - Probable Human Carcinogen	IRIS	02/26/14
Hexachlorobutadiene [7]	7.8E-02	kg-day/mg	1.0	7.80E-02	kg-day/mg	C - Possible Human Carcinogen	IRIS	02/26/14
Indeno(1,2,3-cd)pyrene	7.3E-01	kg-day/mg	0.13	9.49E-02	kg-day/mg	B2 - Probable Human Carcinogen	RSL	11/01/13
Naphthalene	NA	NA	0.13	NA	NA	C - Possible Human Carcinogen	IRIS	02/26/14
Pyrene	NA	NA	0.13	NA	NA	D - Not Classifiable	IRIS	02/26/14
PCBs								
Aroclor 1248 [5]	2.0E+00	kg-day/mg	0.14	2.80E-01	kg-day/mg	NA	RSL	11/01/13
Aroclor 1254 [5]	2.0E+00	kg-day/mg	0.14	2.80E-01	kg-day/mg	B2 - Probable Human Carcinogen	RSL	11/01/13
Aroclor 1260	2.0E+00	kg-day/mg	0.14	2.80E-01	kg-day/mg	B2 - Probable Human Carcinogen	RSL	11/01/13
Aroclor 1268 [5]	2.0E+00	kg-day/mg	0.14	2.80E-01	kg-day/mg	NA	RSL	11/01/13

TABLE 6.1
CANCER TOXICITY DATA -- ORAL/DERMAL
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Chemical of Potential Concern	Oral Cancer Slope Factor		Oral Absorption Efficiency for Dermal (1)	Absorbed Cancer Slope Factor for Dermal		Weight of Evidence/ Cancer Guideline Description	Oral CSF	
	Value	Units		Value	Units		Source(s)	Date(s)
Dioxin								
TCDD (5)	1.3E+05	kg-day/mg	0.03	3.90E+03	kg-day/mg	NA	RSL	11/01/13
Metals								
Aluminum	NA	NA	NA	NA	NA	NA	NA	NA
Antimony	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	1.5E+00	kg-day/mg	0.03	4.50E-02	kg-day/mg	A - Known Human Carcinogen	IRIS	02/26/14
Barium	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium	NA	NA	NA	NA	NA	B1 - Probable Human Carcinogen	IRIS	02/26/14
Chromium	NA	NA	NA	NA	NA	D - Not Classifiable	IRIS	02/26/14
Chromium, hexavalent (5)	5.0E-01	kg-day/mg	0.025	1.25E-02	kg-day/mg	A - Known Human Carcinogen	RSL	11/01/13
Cobalt	NA	NA	NA	NA	NA	Likely to be Carcinogenic	PPRTV	02/26/14
Copper	NA	NA	NA	NA	NA	D - Not Classifiable	IRIS	02/26/14
Lead	NA	NA	NA	NA	NA	B2 - Probable Human Carcinogen	IRIS	02/26/14
Thallium	NA	NA	1	NA	NA	Inadequate Information	IRIS	02/26/14
Vanadium	NA	NA	1	NA	NA	Inadequate Information	PPRTV	02/26/14
Zinc	NA	NA	0.001	NA	NA	NA	IRIS	02/26/14

(1) USEPA, 2004. Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment). EPA/540/R/99/005 - chapter 4.
(2) Provisional Peer Reviewed Toxicity Values (PPRTV) for Superfund - USEPA, 2014. http://hhpprtv.ornl.gov/
(3) NA - Not available
(4) Integrated Risk Information System (IRIS) - USEPA, February 2014. <http://cfpub.epa.gov/ncea/iris/index.html>
(5) USEPA has no toxicity value for this compound. Value presented is from the California EPA or other source and may not be supported by the literature.
(6) Regional Screening Table (RSL) - USEPA, November 2013 <http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/index.htm>
(7)USEPA has no toxicity value for this compound. Value presented is from the California EPA or other source and may not be supported by the literature.

TABLE 6.2
CANCER TOXICITY DATA -- INHALATION
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

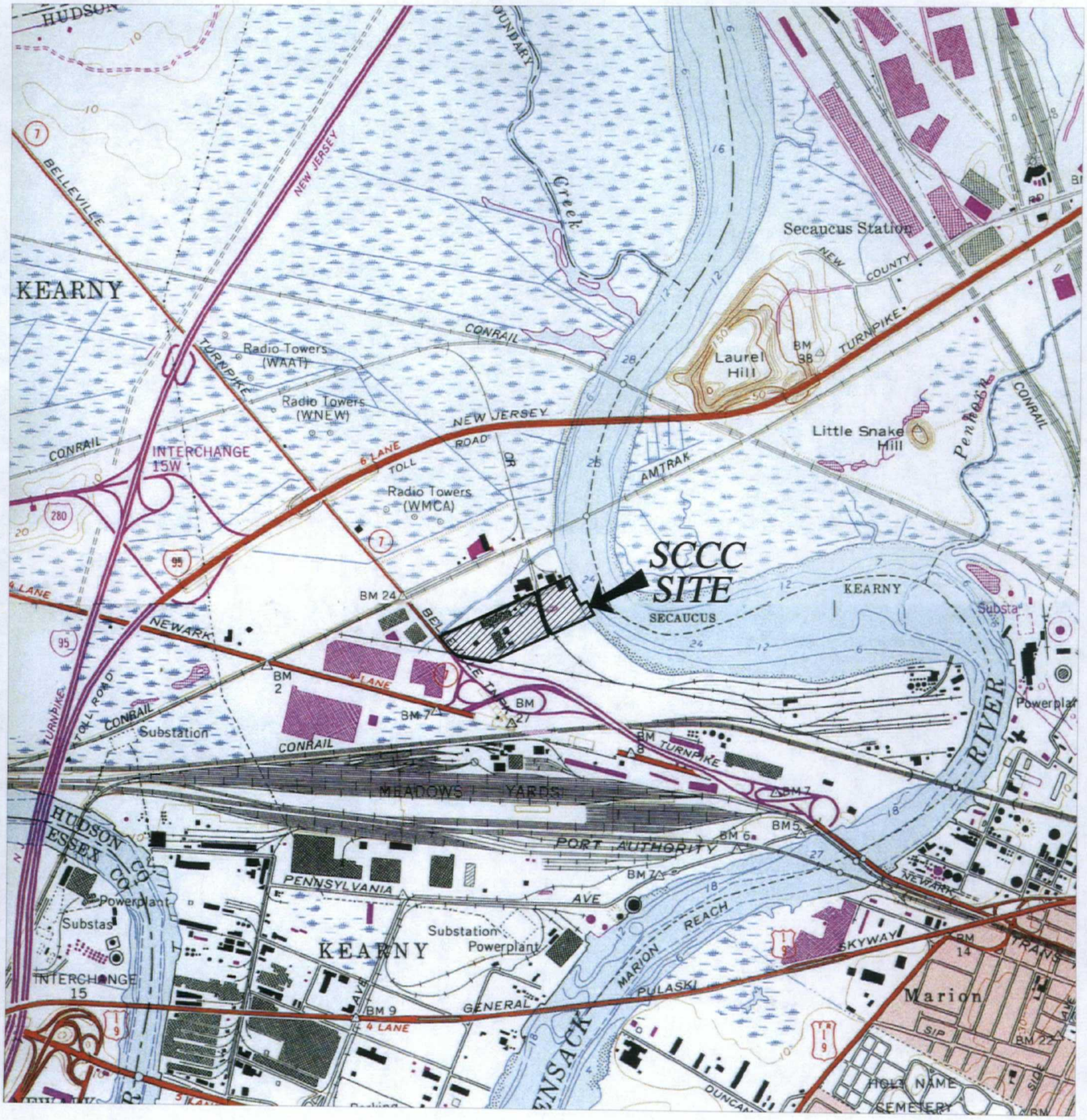
Chemical of Potential Concern	Unit Risk		Inhalation Cancer Slope Factor[1]		Weight of Evidence/ Cancer Guideline Description	Unit Risk : Inhalation CSF	
	Value	Units	Value	Units		Source(s)	Date(s)
Volatile Organics							
1,2,4,5-Tetrachlorobenzene	NA [2]	NA	NA	NA	Inadequate Information	IRIS [3]	02/10/14
1,2,3-Trichlorobenzene	NA	NA	NA	NA	Inadequate Information	PPRTV [4]	02/10/14
1,2,4-Trichlorobenzene	NA	NA	NA	NA	NA	NA	NA
1,2-Dichlorobenzene	NA	NA	NA	NA	D - Not Classifiable	IRIS	02/10/14
1,3-Dichlorobenzene	NA	NA	NA	NA	NA	NA	NA
1,4-Dichlorobenzene	1.1E-05	$1/ug/m^3$	3.85E-02	mg/kg-day	C - Possible Human Carcinogen	RSL [5]	11/01/13
1,2-Dichloropropane [6]	1.0E-05	$1/ug/m^3$	3.50E-02	mg/kg-day	NA	RSL	11/01/13
Benzene	7.8E-06	$1/ug/m^3$	2.73E-02	mg/kg-day	A - Known Human Carcinogen	IRIS	02/10/14
Chlorobenzene	NA	NA	NA	NA	NA	NA	NA
Ethylbenzene [6]	2.5E-06	$1/ug/m^3$	8.75E-03	mg/kg-day	D - Not Classifiable	RSL	11/01/13
Trichloroethene	4.1E-06	$1/ug/m^3$	1.44E-02	mg/kg-day	Carcinogenic	IRIS	02/10/14
Xylenes	NA	NA	NA	NA	Inadequate Information	IRIS	02/10/14
Semivolatile Organics							
1,1-Biphenyl	NA [2]	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	Inadequate Information	IRIS	02/10/14
Benzo(a)anthracene	1.1E-04	$1/ug/m^3$	3.85E-01	mg/kg-day	B2 - Probable Human Carcinogen	RSL	11/01/13
Benzo(a)pyrene	1.1E-03	$1/ug/m^3$	3.85E+00	mg/kg-day	B2 - Probable Human Carcinogen	RSL	11/01/13
Benzo(b)fluoranthene	1.1E-04	$1/ug/m^3$	3.85E-01	mg/kg-day	B2 - Probable Human Carcinogen	RSL	11/01/13
Bis (2-ethylhexyl)phthalate [6]	2.4E-06	$1/ug/m^3$	8.40E-03	mg/kg-day	B2 - Probable Human Carcinogen	RSL	11/01/13
Chrysene	1.1E-05	$1/ug/m^3$	3.85E-02	mg/kg-day	B2 - Probable Human Carcinogen	RSL	11/01/13
Dibenz(a,h)anthracene	1.2E-03	$1/ug/m^3$	4.20E+00	mg/kg-day	B2 - Probable Human Carcinogen	RSL	11/01/13
Di-n-Octylphthalate	NA	NA	NA	NA	Inadequate Information	PPRTV	02/10/14
Hexachlorobenzene	4.6E-04	$1/ug/m^3$	1.61E+00	mg/kg-day	B2 - Probable Human Carcinogen	IRIS	02/26/14
Hexachlorobutadiene [6]	2.2E-05	$1/ug/m^3$	7.70E-02	mg/kg-day	C - Possible Human Carcinogen	IRIS	02/26/14
Indeno(1,2,3-cd)pyrene	1.1E-04	$1/ug/m^3$	3.85E-01	mg/kg-day	B2 - Probable Human Carcinogen	RSL	11/01/13
Naphthalene	3.4E-05	$1/ug/m^3$	1.19E-01	mg/kg-day	C - Possible Human Carcinogen	RSL	11/01/13
Pyrene	NA	NA	NA	NA	D - Not Classifiable	IRIS	02/26/14

TABLE 6.2
CANCER TOXICITY DATA -- INHALATION
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Chemical of Potential Concern	Unit Risk		Inhalation Cancer Slope Factor(1)		Weight of Evidence/ Cancer Guideline Description	Unit Risk : Inhalation CSF	
	Value	Units	Value	Units		Source(s)	Date(s)
PCBs							
Aroclor 1248 (6)	5.7E-04	1/ug/m³	2.00E+00	mg/kg-day	NA	RSL	11/01/13
Aroclor 1254 (6)	5.7E-04	1/ug/m³	2.00E+00	mg/kg-day	B2 - Probable Human Carcinogen	RSL	11/01/13
Aroclor 1260 (6)	5.7E-04	1/ug/m³	2.00E+00	mg/kg-day	B2 - Probable Human Carcinogen	RSL	11/01/13
Aroclor 1268 (6)	5.7E-04	1/ug/m³	2.00E+00	mg/kg-day	NA	RSL	11/01/13
Dioxin							
TCDD (6)	3.8E+01	1/ug/m³	1.33E+05	mg/kg-day	NA	RSL	11/01/13
Metals							
Aluminum	NA	NA	NA	NA	NA	NA	NA
Antimony	NA	NA	NA	NA	NA	NA	NA
Arsenic	4.3E-03	1/ug/m³	1.51E+01	mg/kg-day	A - Known Human Carcinogen	IRIS	02/26/14
Barium	NA	NA	NA	NA	D - Not Classifiable	IRIS	02/26/14
Cadmium	1.8E-03	1/ug/m³	6.30E+00	mg/kg-day	B1 - Probable Human Carcinogen	IRIS	02/26/14
Chromium	NA	NA	NA	NA	D - Not Classifiable	IRIS	02/26/14
Chromium, hexavalent	1.2E-02	1/ug/m³	4.20E+01	mg/kg-day	A - Known Human Carcinogen	IRIS	02/26/14
Cobalt	9.0E-01	1/ug/m³	3.15E+03	mg/kg-day	Likely to be Carcinogenic	PPRTV	02/26/14
Copper	NA	NA	NA	NA	D - Not Classifiable	IRIS	02/26/14
Iron	NA	NA	NA	NA	Inadequate Information	IRIS	02/26/14
Lead	NA	NA	NA	NA	B2 - Probable Human Carcinogen	IRIS	02/26/14
Nickel (5,6)	2.6E-04	1/ug/m³	9.10E-01	mg/kg-day	NA	RSL	11/01/13
Thallium	NA	NA	NA	NA	Inadequate Information	IRIS	02/26/14
Vanadium	NA	NA	NA	NA	Inadequate Information	PPRTV	02/26/14
Zinc	NA	NA	NA	NA	NA	NA	NA

(1) Inhalation Cancer Slope Factor (kg-day/mg) = Inhalation Unit Risk (ug/m³) x 70 (kg) x 1000 (ug/mg) / 20 (m³/day)
(2) NA - Not available
(3) Integrated Risk Information System (IRIS) - USEPA, February 2014. <http://cfpub.epa.gov/ncea/iris/index.html>
(4) Provisional Peer Reviewed Toxicity Values (PPRTV) for Superfund - USEPA, 2014. http://hhpprtv.ornl.gov/
(5) Regional Screening Table (RSL) - USEPA, November 2013 <http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/index.htm>
(6) USEPA has no toxicity value for this compound. Value presented is from the California EPA or other source, or similar compound and may not be supported by the literature.

FIGURES



NEW JERSEY

QUADRANGLE LOCATION

REFERENCE: USGS 7.5 MINUTE TOPOGRAPHIC QUADRANGLES OF JERSEY CITY, AND WEEHAWKEN, NEW JERSEY

ISSUE DATE:

KEY ENVIRONMENTAL, INC.
200 THIRD AVENUE
CARNEGIE, PA 15106

PERFORMING PARTIES GROUP

DRWN: SCC	DATE: 03/14/14
CHKD: RJH	DATE: 03/14/14
APPD: JSZ	DATE: 03/14/14
SCALE:	1"= 2000'

KEY ENVIRONMENTAL INCORPORATED

PATHWAY ANALYSIS REPORT
STANDARD CHLORINE CHEMICAL CO., INC. SITE
KEARNY, HUDSON COUNTY, NEW JERSEY

SITE LOCATION MAP

PROJECT NO: 2014-01

FIGURE 1

LEGEND

PROPERTY BOUNDARY

0 150 300 FEET

REV #	DATE	DESCRIPTION	APPD
△			
△			
△0			

REFERENCE:

1. PROPERTY BOUNDARY SHOWN HEREON FROM SHEET 1 OF 1 TITLED "SURVEY OF PROPERTY, TAX LOTS 32.02, 46, 47 & 47R, BLOCK 287, TAX LOTS 48, 49, 50, 51, 52 AND 52R, BLOCK 287, TOWN OF KEARNY, HUDSON COUNTY, NEW JERSEY," DATED JULY 1, 2009 (REVISION 2: JULY 29, 2009), PREPARED BY DYKSTRA ASSOCIATES, PC.
2. IMAGE PROVIDED BY GOOGLE EARTH DATED JUNE, 2012.

ISSUE DATE:

KEY ENVIRONMENTAL, INC.
200 THIRD AVENUE
CARNEGIE, PA 15106

PERFORMING PARTIES GROUP

DRWN: SCC	DATE: 03/14/14
CHKD: AH	DATE: 03/14/14
APPD: JSZ	DATE: 03/14/14
SCALE: AS SHOWN	

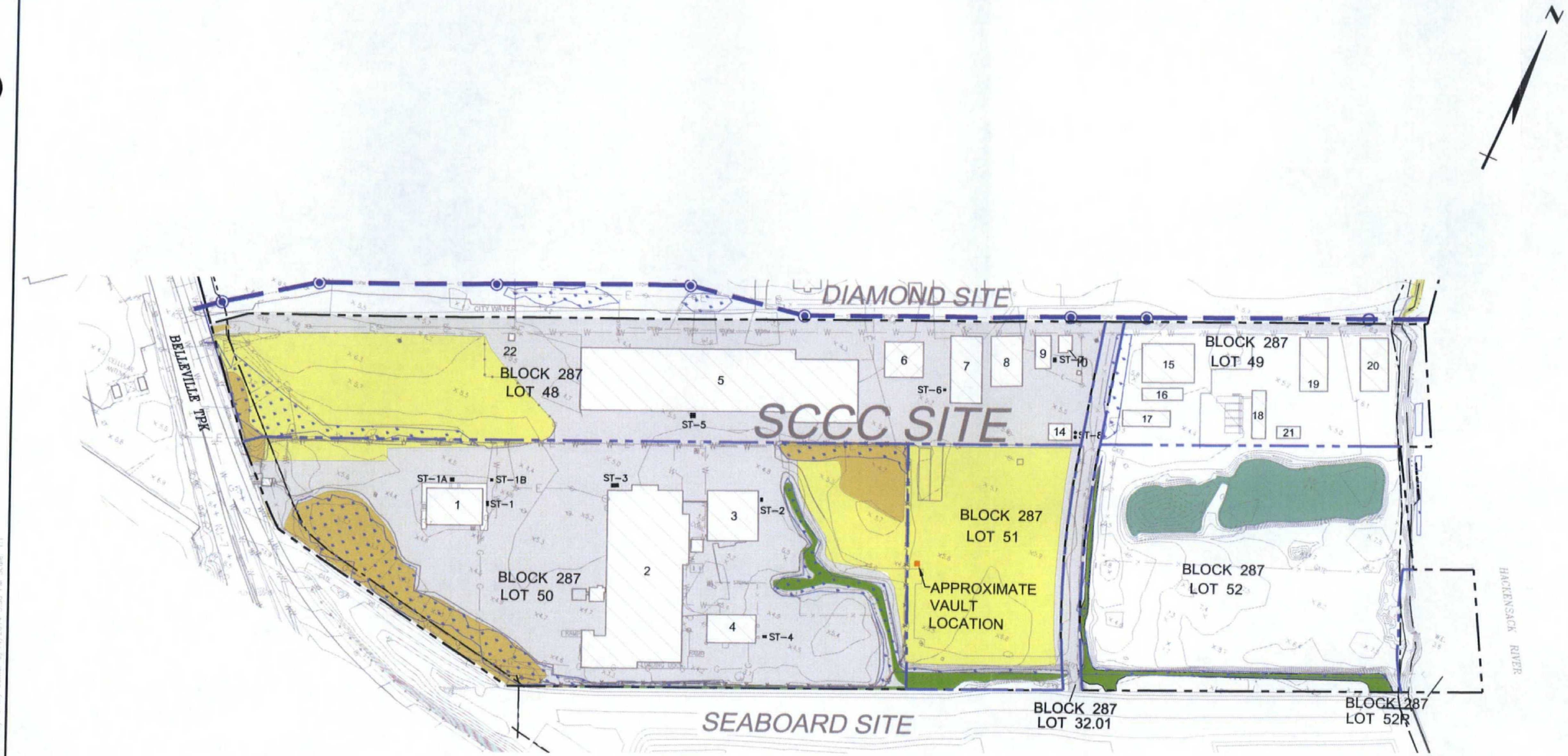
KEY ENVIRONMENTAL INCORPORATED

PATHWAY ANALYSIS REPORT
STANDARD CHLORINE CHEMICAL CO., INC. SITE
KEARNY, HUDSON COUNTY, NEW JERSEY

2012 AERIAL PHOTOGRAPH

PROJECT NO: 2014-01

FIGURE 2



LEGEND

- PROPERTY BOUNDARY
- EXISTING SURFACE COVER IRM COMPRISED OF ASPHALTIC CONCRETE
- EXISTING SURFACE COVER IRM COMPRISED OF SOIL
- EXISTING SURFACE COVER IRM COMPRISED OF GEOMEMBRANE OVERLAIN WITH AGGREGRATE
- EAST AND WEST LAGOONS
- SOUTH DITCH SOFT SOILS
- EXISTING WETLANDS
- EXISTING BUILDING
- FORMER BUILDING FOUNDATION
- EXISTING UTILITY POLES
- EXISTING LIGHT STANDARD
- EXISTING OVERHEAD POWER LINE
- EXISTING WATER LINES
- EXISTING GAS LINES
- EXISTING STORM DRAIN
- 8-FOOT HIGH SECURITY FENCE WITH DUST CONTROL
- EXISTING STORM DRAIN (48" PIPE)
- EXISTING DROP INLET
- SEPTIC TANK LOCATION
- LOT BOUNDARY
- APPROXIMATE VAULT LOCATION (CONTENTS REMOVED ON JUNE 26, 2008)

0 200 400 FEET

REV #	DATE	DESCRIPTION	APPD
1	03/22/13	ADDED VAULT LOCATION.	JSZ

REFERENCE:

1. EXISTING GROUND SURFACE CONTOURS PER AIR SURVEY, DULLES, VIRGINIA, APRIL 14, 2001. HORIZONTAL REFERENCE: NEW JERSEY STATE PLANE COORDINATES (NAD 1927). VERTICAL REFERENCE:NATIONAL GEODETIC VERTICAL DATUM (NGVD 1929).
2. PROPERTY BOUNDARY SHOWN HEREON FROM SHEET 1 OF 1 TITLED "SURVEY OF PROPERTY, TAX LOTS 32.02, 46, 47 & 47R, BLOCK 287, TAX LOTS 48, 49, 50, 51, 52 AND 52R, BLOCK 287, TOWN OF KEARNY, HUDSON COUNTY, NEW JERSEY," DATED JULY 1, 2009 (REVISION 2: JULY 29, 2009), PREPARED BY DYKSTRA ASSOCIATES, PC.
3. EXISTING WETLANDS PER WETLAND DELINEATION BY PRINCETON HYDRO, LLC FOR KEY ENVIRONMENTAL, INC. PERFORMED IN MARCH 2009.

ISSUE DATE:

KEY ENVIRONMENTAL, INC.
200 THIRD AVENUE
CARNEGIE, PA 15106

PERFORMING PARTIES GROUP

DRWN:	SCC	DATE:	03/14/14
CHKD:	AH	DATE:	03/14/14
APPD:	JSZ	DATE:	03/14/14
SCALE:	AS SHOWN		

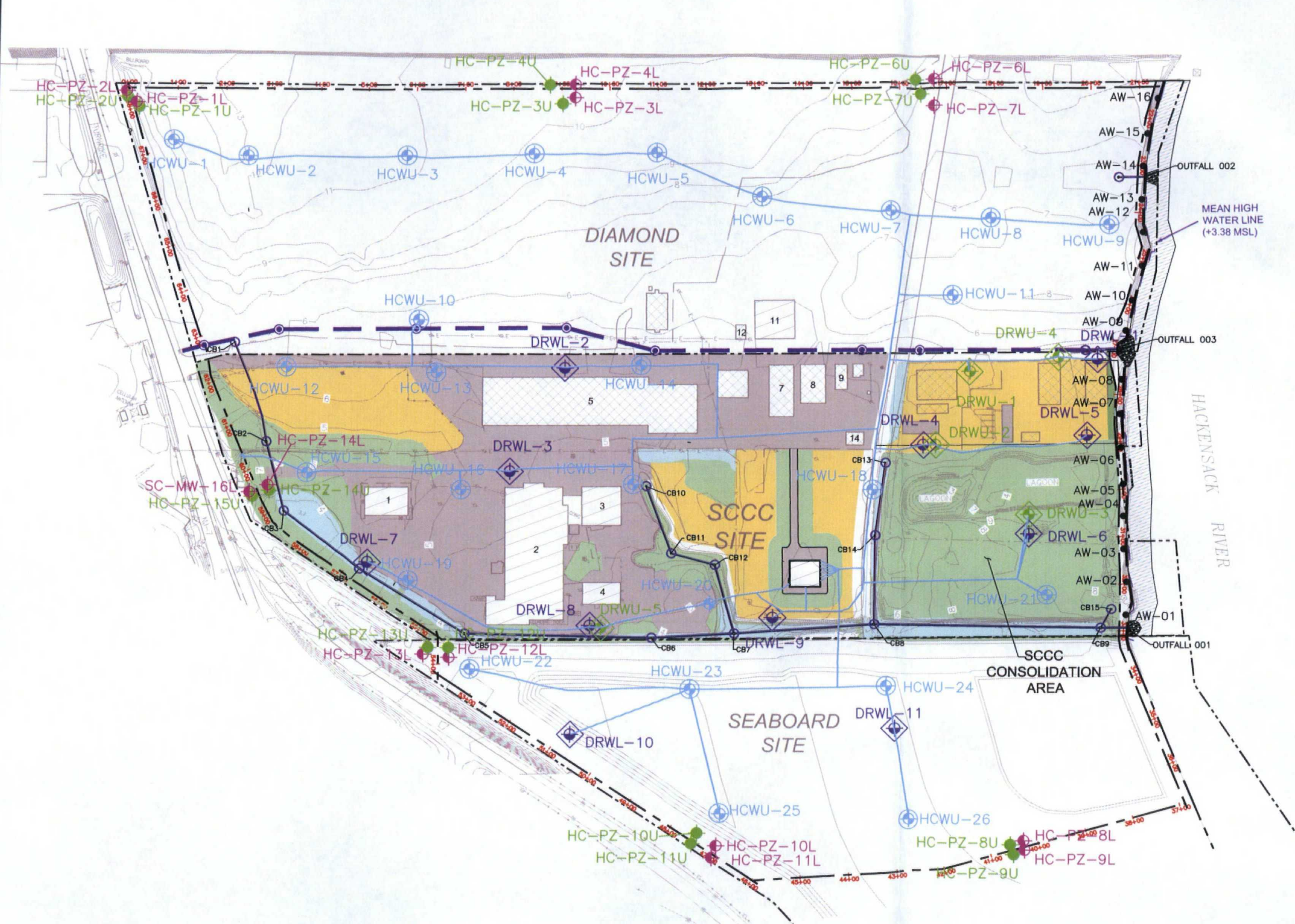
KEY ENVIRONMENTAL INCORPORATED

PATHWAY ANALYSIS REPORT
STANDARD CHLORINE CHEMICAL CO., INC. SITE
KEARNY, HUDSON COUNTY, NEW JERSEY

HISTORICAL SITE ARRANGEMENT SHOWING INTERIM MEASURES (2008)

PROJECT NO: 2014-01

FIGURE 3



LEGEND

- EXISTING ACCESS ROAD
- EXISTING NEW JERSEY TRANSIT RAILROAD (ACTIVE)
- EXISTING FENCE
- EXISTING STRUCTURES
- EXISTING UTILITY POLES
- EXISTING LIGHT STANDARD
- EXISTING OVERHEAD POWER LINE
- PROPERTY BOUNDARY
- EXISTING CONCRETE PAD
- EXISTING GROUND SURFACE ELEVATION CONTOURS
- EXISTING VEGETATION
- EXISTING STREAM, POND AND RIVER BANK
- EXISTING ELEVATION (FEET-MSL)
- SLURRY WALL LOCATION
- STEEL SHEET PILE WALL LOCATION
- GROUNDWATER CONVEYANCE PIPING TRENCH ALIGNMENT
- MEAN HIGH WATER (MHW)
- HCWU-21 — FILL UNIT GROUNDWATER EXTRACTION (HYDRAULIC CONTROL) WELL LOCATION
- DRWU-3 — FILL UNIT DNAPL RECOVERY WELL LOCATION
- DRWL-6 — SAND UNIT DNAPL RECOVERY WELL LOCATION
- HC-PZ-10U — HYDRAULIC CONTROL PIEZOMETER UPPER ZONE
- HC-PZ-10L — HYDRAULIC CONTROL PIEZOMETER LOWER ZONE
- AW-01 — SEMI-DEEP ANODE WELL LOCATION
- TREATED WATER PERMITTED DISCHARGE PIPING TRENCH ALIGNMENT
- EXISTING STORM DRAIN (48" PIPE)
- CULVERT
- EXISTING DROP INLET
- DROP INLET
- WATER LINE TO TREATMENT BUILDING
- EXISTING BUILDING
- FORMER BUILDING FOUNDATION/SLAB
- NEAR-SHORE SEDIMENT REMOVAL
- WETLANDS
- VEGETATIVE COVER
- GENERAL STONE COVER
- ASPHALT

0 120 240 FEET

PERFORMING PARTIES GROUP

DRWN: SCC	DATE: 03/14/14
CHKD: AH	DATE: 03/14/14
APPD: JSZ	DATE: 03/14/14
SCALE: AS SHOWN	

KEY ENVIRONMENTAL INCORPORATED

PATHWAY ANALYSIS REPORT
STANDARD CHLORINE CHEMICAL CO., INC. SITE
KEARNY, NEW JERSEY

ISSUE DATE:

KEY ENVIRONMENTAL, INC.
200 THIRD AVENUE
CARNEGIE, PA 15106

CURRENT SITE CONDITIONS (2012)

PROJECT NO: 2014-01

FIGURE 4

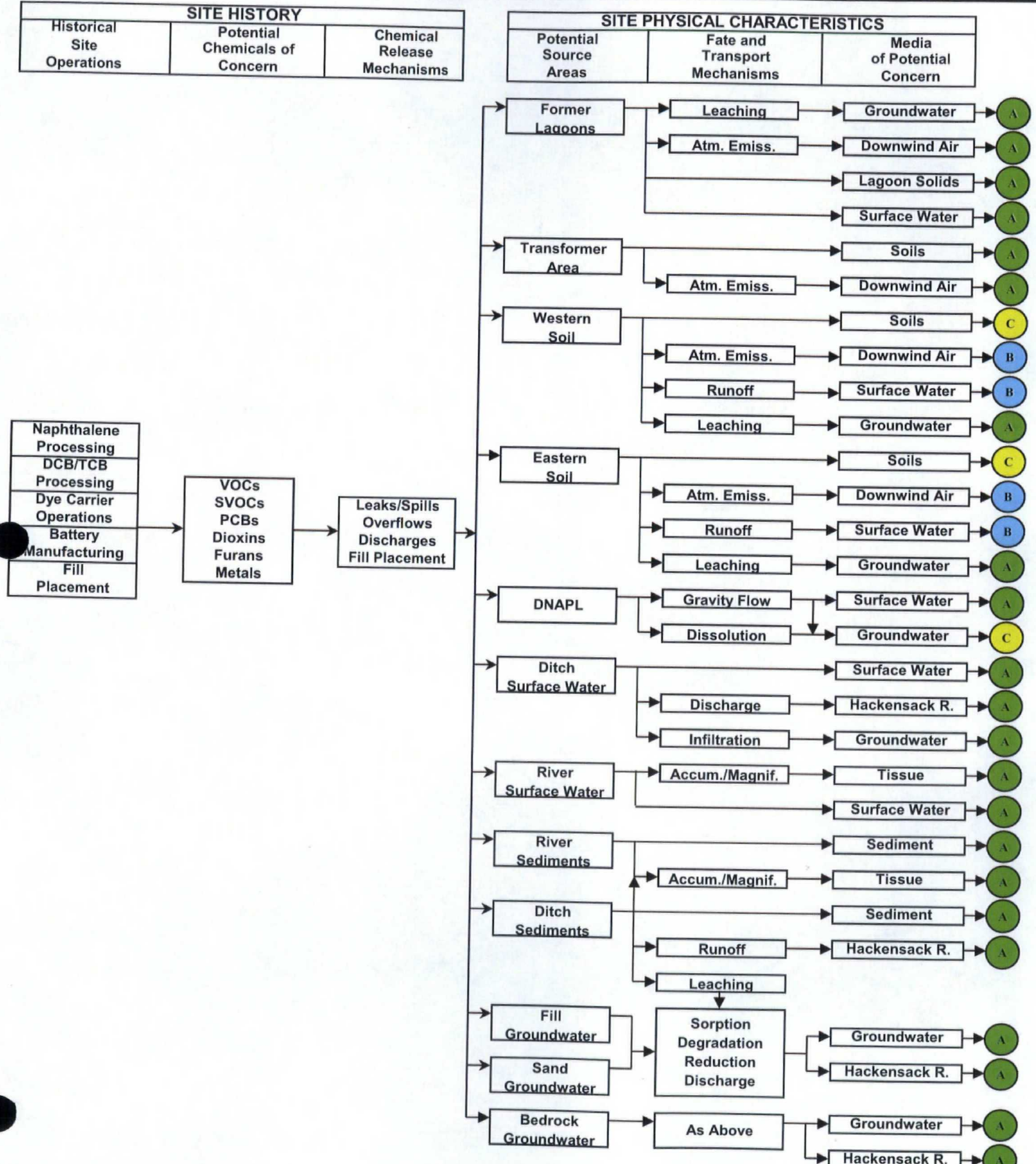
REV #	DATE	DESCRIPTION	APPD

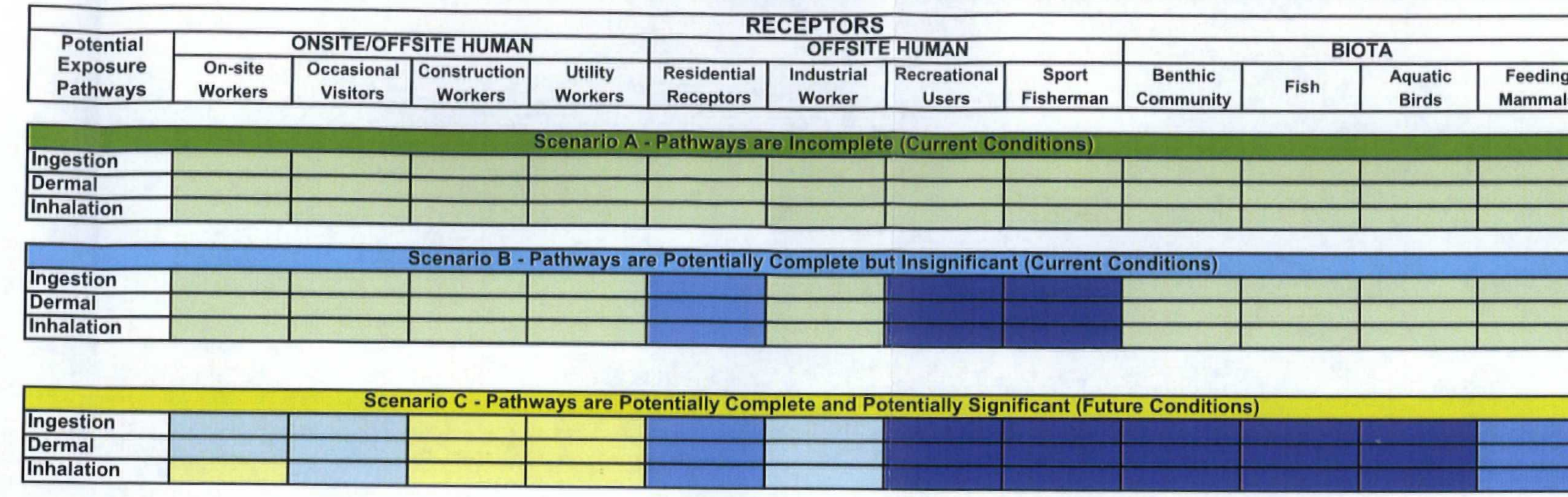
REFERENCE:

1. EXISTING GROUND SURFACE CONTOURS PER AIR SURVEY, DULLES, VIRGINIA, APRIL 14, 2001. HORIZONTAL REFERENCE: NEW JERSEY STATE PLANE COORDINATES (NAD 1927). VERTICAL REFERENCE:NATIONAL GEODETIC VERTICAL DATUM (NGVD 1929).
2. PROPERTY BOUNDARY SHOWN HEREON FROM SHEET 1 OF 1 TITLED "SURVEY OF PROPERTY, TAX LOTS 32.02, 46, 47 & 47R, BLOCK 287, TAX LOTS 48, 49, 50, 51, 52 AND 52R, BLOCK 287, TOWN OF KEARNY, HUDSON COUNTY, NEW JERSEY," DATED JULY 1, 2009 (REVISION 2: JULY 29, 2009), PREPARED BY DYKSTRA ASSOCIATES, PC.
3. EXISTING WETLANDS PER WETLAND DELINEATION BY PRINCETON HYDRO, LLC FOR KEY ENVIRONMENTAL, INC. PERFORMED IN MARCH 2009.

FIGURE 5

CONCEPTUAL SITE MODEL
SCCC SITE - KEARNY, NEW JERSEY





Pathway is incomplete at present as a result of implementation of IRMs and IRA and is expected to remain so in the future.

All direct onsite groundwater exposure pathways (no groundwater use).
All potential exposure pathways associated with the lagoons (capped).
Discharge of DNAPL to the south ditch or Hackensack River (barrier walls in place).
Discharge of all groundwater to the Hackensack River (barrier walls in place).
Direct contact with transformer area soils eliminated via removal.
Atmospheric emission of dust from transformer area eliminated via removal.
Potential for direct contact with surface water in the South Ditch eliminated via removal and new stormwater management system.
Discharge of surface water from the South Ditch (will be noncontact surface water, sediments removed).
All potential nongroundwater exposures associated with the south ditch (impacted sediment removed).
Direct contact with eastern area soils by outdoor site workers and visitors (cover placed).
Direct contact with Hackensack River surface water (does not consider other sources).
Accumulation and magnification of Hackensack River constituents in surface water (does not consider other sources).
Human and ecological receptor direct contact with Hackensack River sediments (sediments removedl).
Accumulation and magnification of Hackensack River constituents in sediments (does not consider other sources - river sediments removed).

Pathway may be complete after IRA implementation but is expected to be insignificant.

Infrequent exposures to surface soils by visitors, workers, or terrestrial ecological receptors could occur if cover materials are not maintained.
Atmospheric emission of volatiles or fugitive dust from non-remediated areas (monitoring data during active remediation showed no risk).
Runoff of western area soil to receiving surface waters (western soils relatively unimpacted) and eastern area soil (stormwater management, capping and revegetation in place). Under a future disturbance scenario, residents, recreators, and fishermen could experience low risk as a result of erosion and runoff of particulates. Surface covers are in place to prevent such releases. Stormwater monitoring has shown that such releases are not occurring under current conditions. Institutional controls will be implemented to preclude such releases in the future.

Pathway is potentially complete after IRA implementation and may be significant for humans and ecological receptors.

Potential for direct contact with western area soils and groundwater by utility workers and construction workers exists under a future scenario.
Potential for direct contact with eastern area soils and groundwater by utility workers and construction workers exists under a future scenario.
Potential for direct contact with shallow groundwater by utility workers and construction workers exists under a future scenario.
Potential for exposure via vapor intrusion into future buildings

Notes: Potential exposures associated with the Hackensack River are being addressed in a broader context. Potential site releases to the Hackensack River from the SCCC Site have been mitigated and impacted sediments have been excavated from the river.

Seaboard Site soils were investigated prior to the Administrative Order for Seaboard issued by NJDEP, and prior to emplacement of PDM.

APPENDIX A

CLASSIFICATION EXCEPTION AREA / WELL RESTRICTION AREA

Classification Exception Area/Well restriction Area

Case Information

CEA ID: CEA - 2240

Activity Number RPC040001

Subject Item ID: CEA1167113

Case ID	250063 RPC040001
Preferred Id	250063
Case	HUDSON COUNTY CHROMATE - KEARNY
Address :	VARIOUS LOCATIONS
City:	Kearny Town

County Hudson

Lot and Block of the Case	
Block	**Lot**
See Exhibit A [Site Location Map]	

Lot and Block of the CEA		
Block	**Lot**	
286	37a	
286	37c	
287	19	
287	20	
287	20R	
287	27	
287	27R	
287	31	
287	33	

287	33R	
287	35	
287	36	
287	37	
287	38a	
287	38b	
287	39	
287	40	
287	41	
287	41R	
287	46	
287	47	
287	48	
287	49R	
287	50	
287	51	
287	52	
287	52R	
287	54	

Contacts

DEP DOYLE, DAVID
(609) 292 - 2173

Department Oversight Document

CEA Information

Description

This CEA is for the following Chromium Sites located in Kearny Town: 48, 50, 51, 58, 103, 113, 116 and 131. This CEA supercedes and is inclusive of the CEAs previously established for these sites

GW

Aquifer	Vertical Depth
Fill	25

Contaminant

This CEA /WRA applies to the contaminants listed in the table below. The ground water quality criteria / primary drinking water standards for these contaminants are listed in parts per billion (ppb). All constituents standards (N.J.A.C. 7:9:9-6) apply at the designated boundary.

Contaminant	Concentration	1	GWQS	2
Chloride	6,560.00	Micrograms Per Liter	0.10	Micrograms Per Liter

Chromium	87,100.00	Micrograms Per Liter	0.10	Micrograms Per Liter
Chromium (VI)	38,600.00	Micrograms Per Liter	0.10	Micrograms Per Liter
Total dissolved solids (TDS)	10,400.00	Micrograms Per Liter	0.10	Micrograms Per Liter

Site

Note:

1 Maximum concentration detected at the time of CEA estblishment

2 Ground Water Quality Standards

CEA Boundaries

	horizontal	See exhibit B (CEA/WRA Location Map)
	vertical	See exhibit B (CEA/WRA Location Map)
		Included in affected aquifer above

Projected Term of CEA

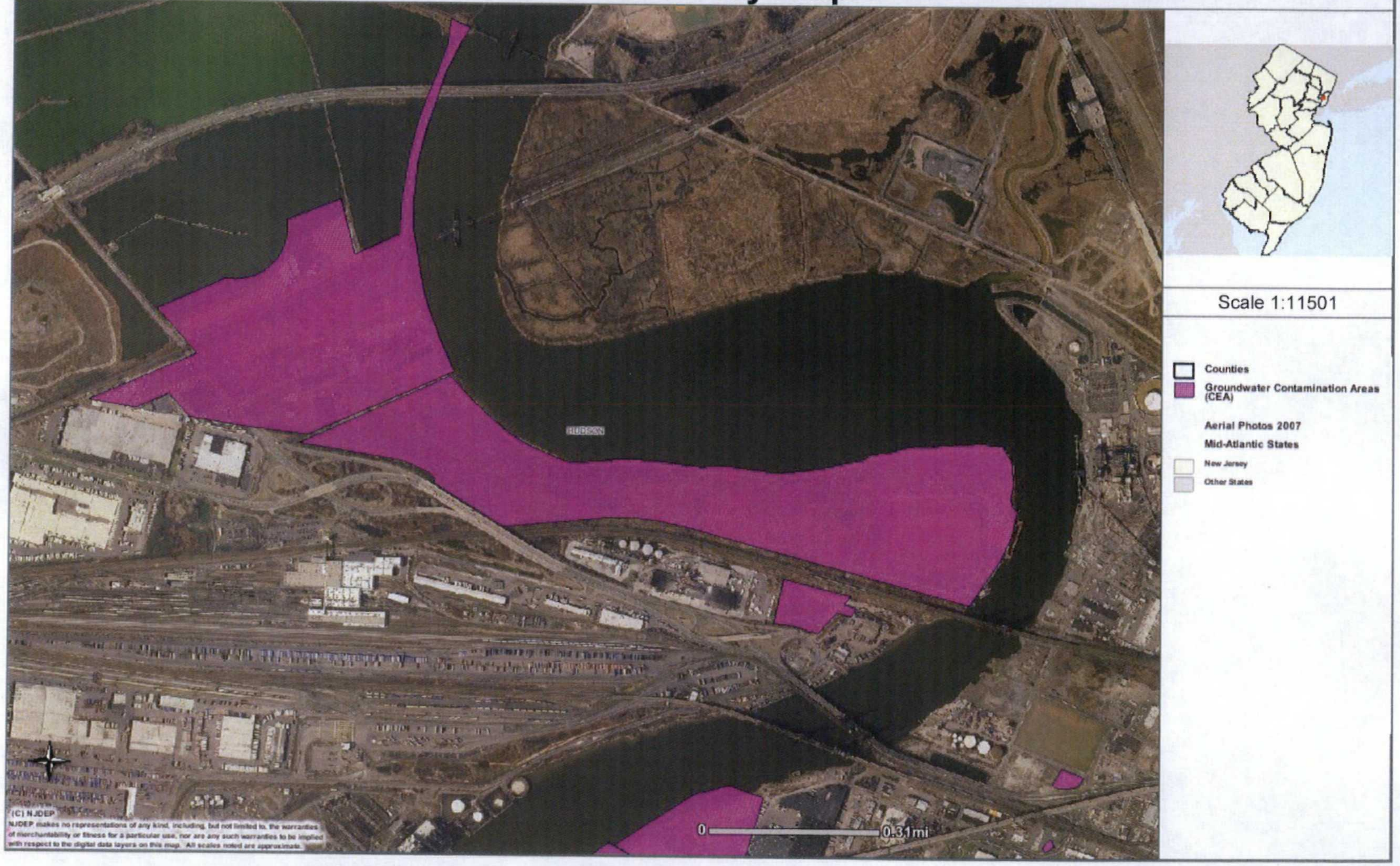
Date Established	7/11/2003
Duration	999.00
Date Closed/Lifted	
Comments	
Note	Since groundwater quality data indicates excedance of contaminants above the Primary Drinking Water Standards, and the designated uses of Class II-A aquifer included potable use, the CEA established for this site is also a Well restriction Area. The extent of Well Restriction shall coincide with the boundaries of the CEA

Well Restrictions set within boundaries of the CEA

Restrictions	Well Restriction Boundries
Double Case Wells	Double Case Wells: With the exception of monitoring wells installed into the first water bearing zone, any proposed well to be installed within the CEA/WRA boundary shall be double cased to an appropriate depth in order to prevent any vertical contaminant migration pathways. This depth is either into a confining layer or 50 feet below the vertical extent of the CEA.
Evaluate Production Wells	Evaluate Production Wells: Any proposed high capacity production wells in the immediate vicinity of the CEA/WRA should be pre-evaluated to determine if pumping from these wells would draw a portion of the contaminant plume into the cone of capture of the production wells or alter the configuration of the contaminant plume.
Sample Potable Wells	Sample Potable Wells: Any potable well to be installed within the footprint of the CEA/WRA shall be sampled annually for the parameters of concern. The first sample shall be collected prior to using the well. If contamination is detected, contact your local Health Department. If the contamination is above the Safe Drinking Water Standards, then the NJDEP Hot Line should be called. Treatment is required for any well that has contamination above the Safe Drinking Water Standards.

Site Specific Well Restrictions	
Restriction	
* None at this time	

New Jersey Map

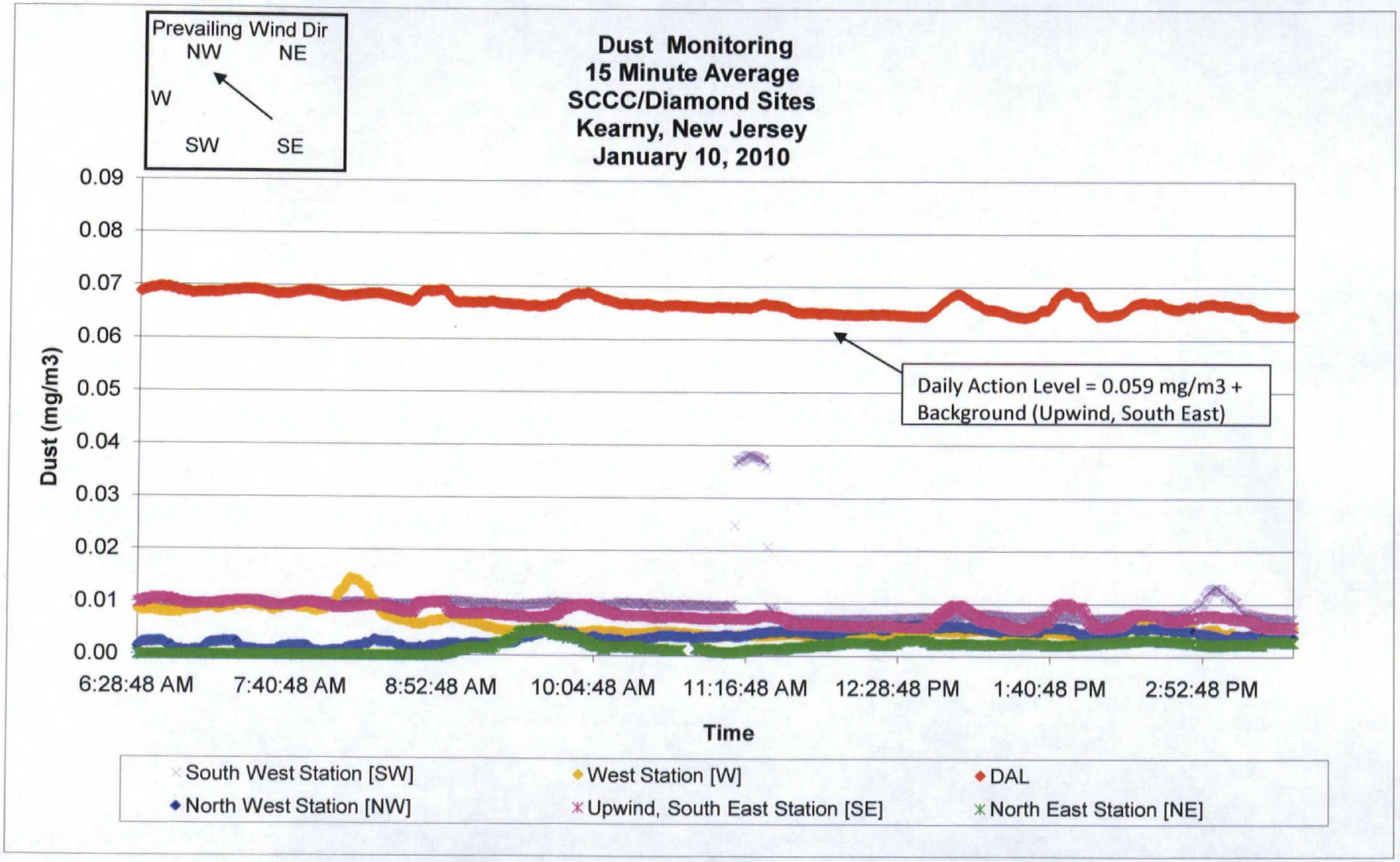


APPENDIX B

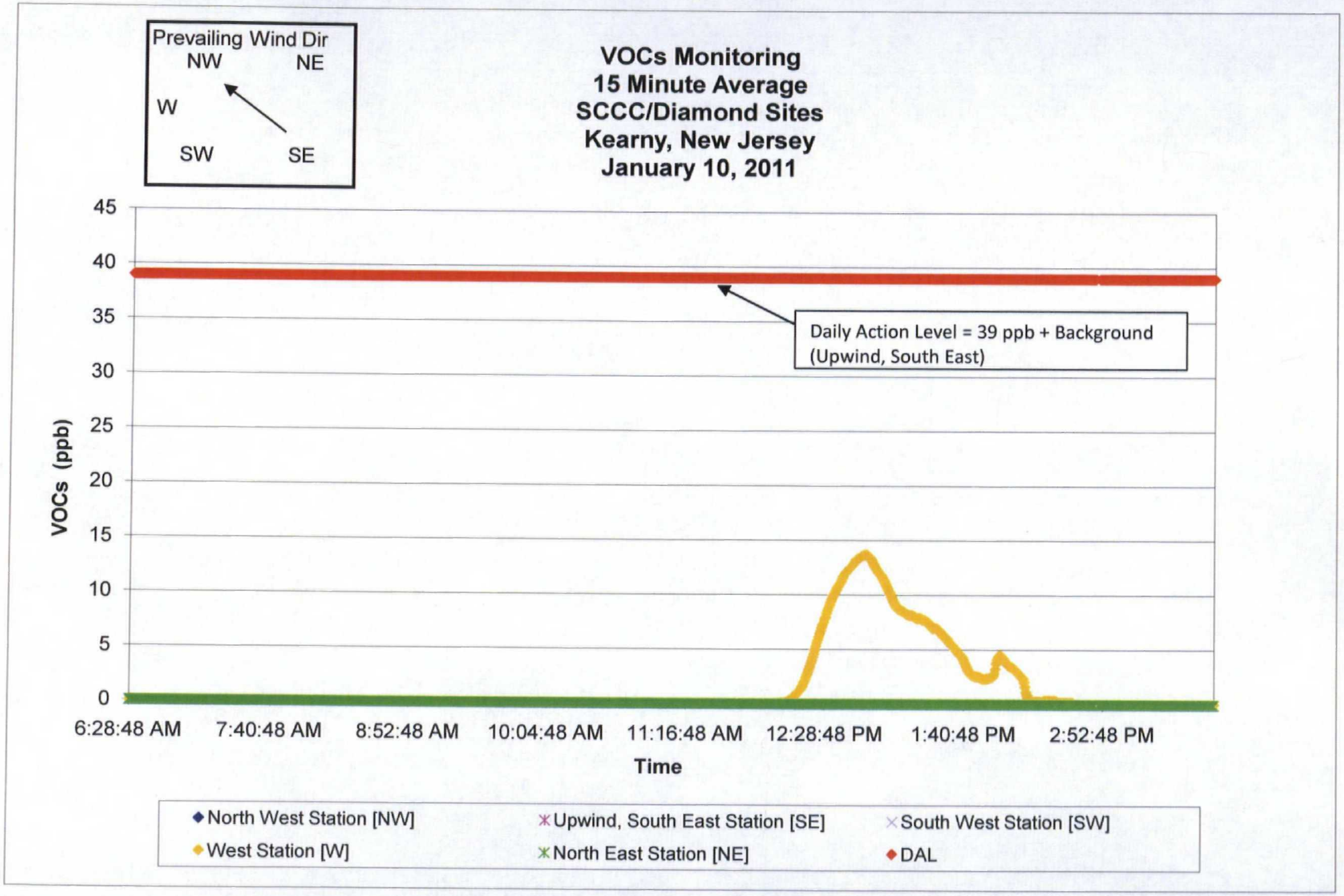
AIR MONITORING RESULTS

APPENDIX B.1

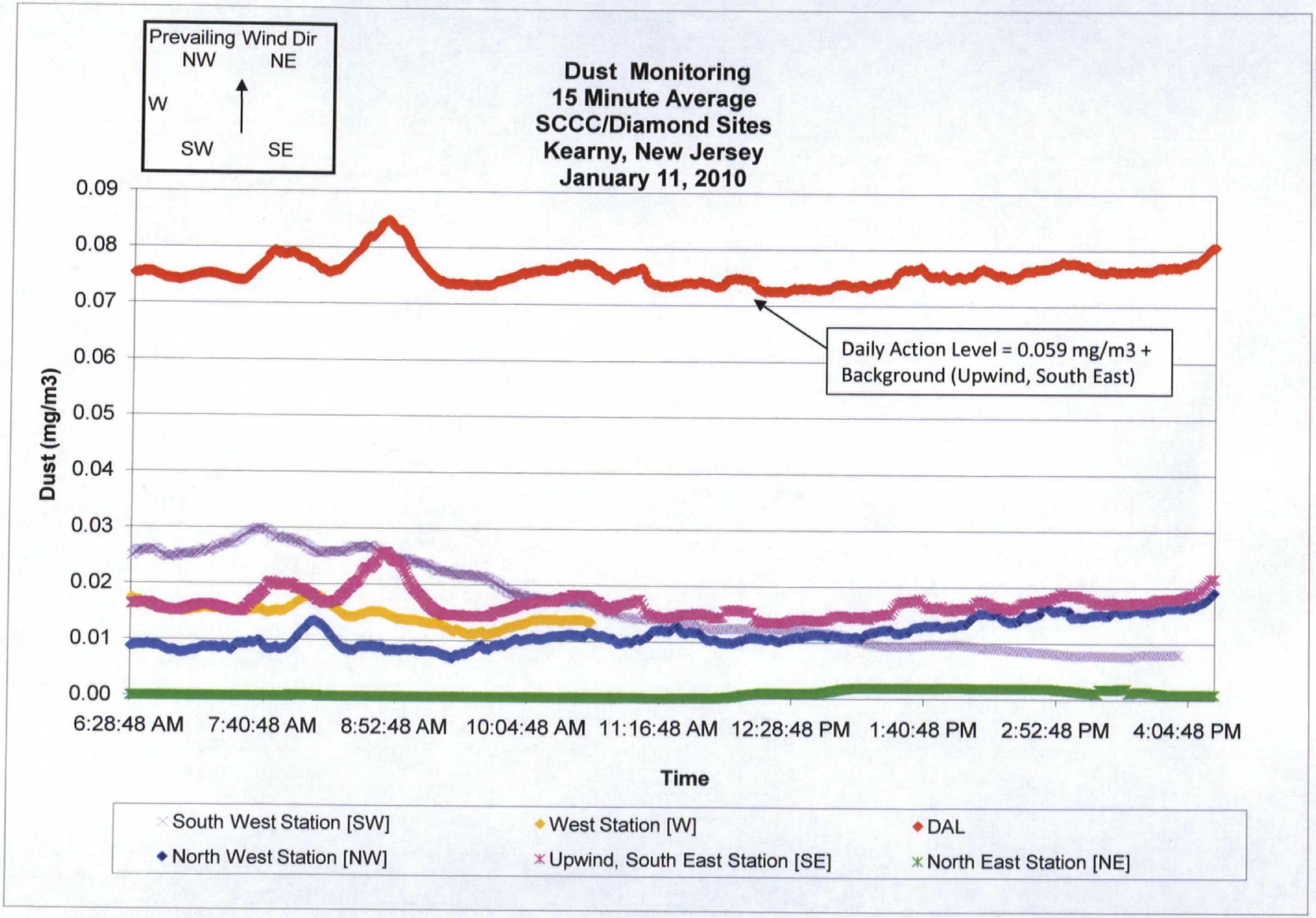
TYPICAL PERIMETER AIR MONITORING GRAPHS



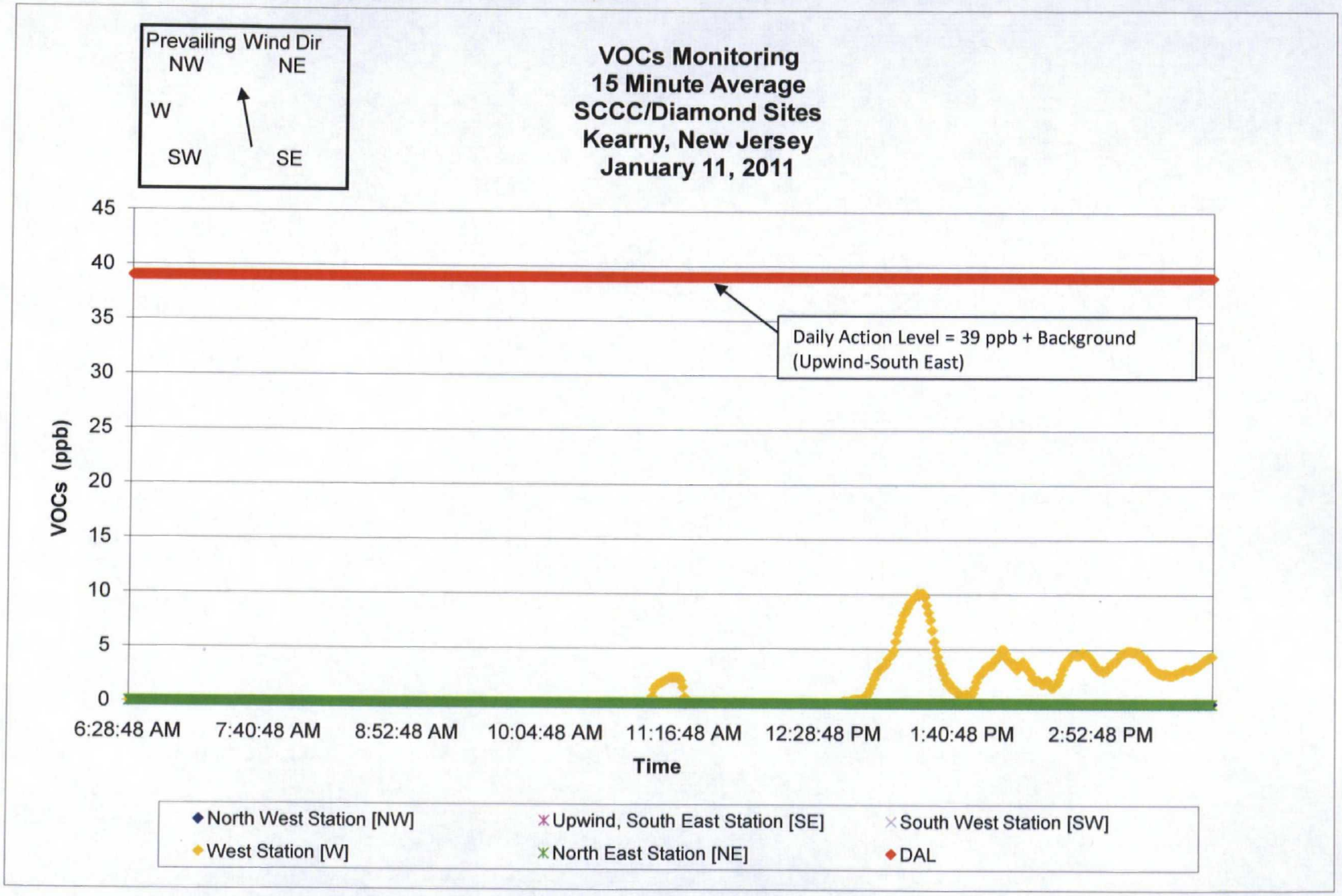
Prevailing Wind Dir
NW
NE
W
SW
SE
Dust Monitoring
15 Minute Average
SCCC/Diamond Sites
Kearny, New Jersey
January 10, 2010
Dust (mg/m3)
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
Daily Action Level = 0.059 mg/m3 + Background (Upwind, South East)
6:28:48 AM
7:40:48 AM
8:52:48 AM
10:04:48 AM
11:16:48 AM
12:28:48 PM
1:40:48 PM
2:52:48 PM
Time
South West Station [SW]
West Station [W]
DAL
North West Station [NW]
Upwind, South East Station [SE]
North East Station [NE]



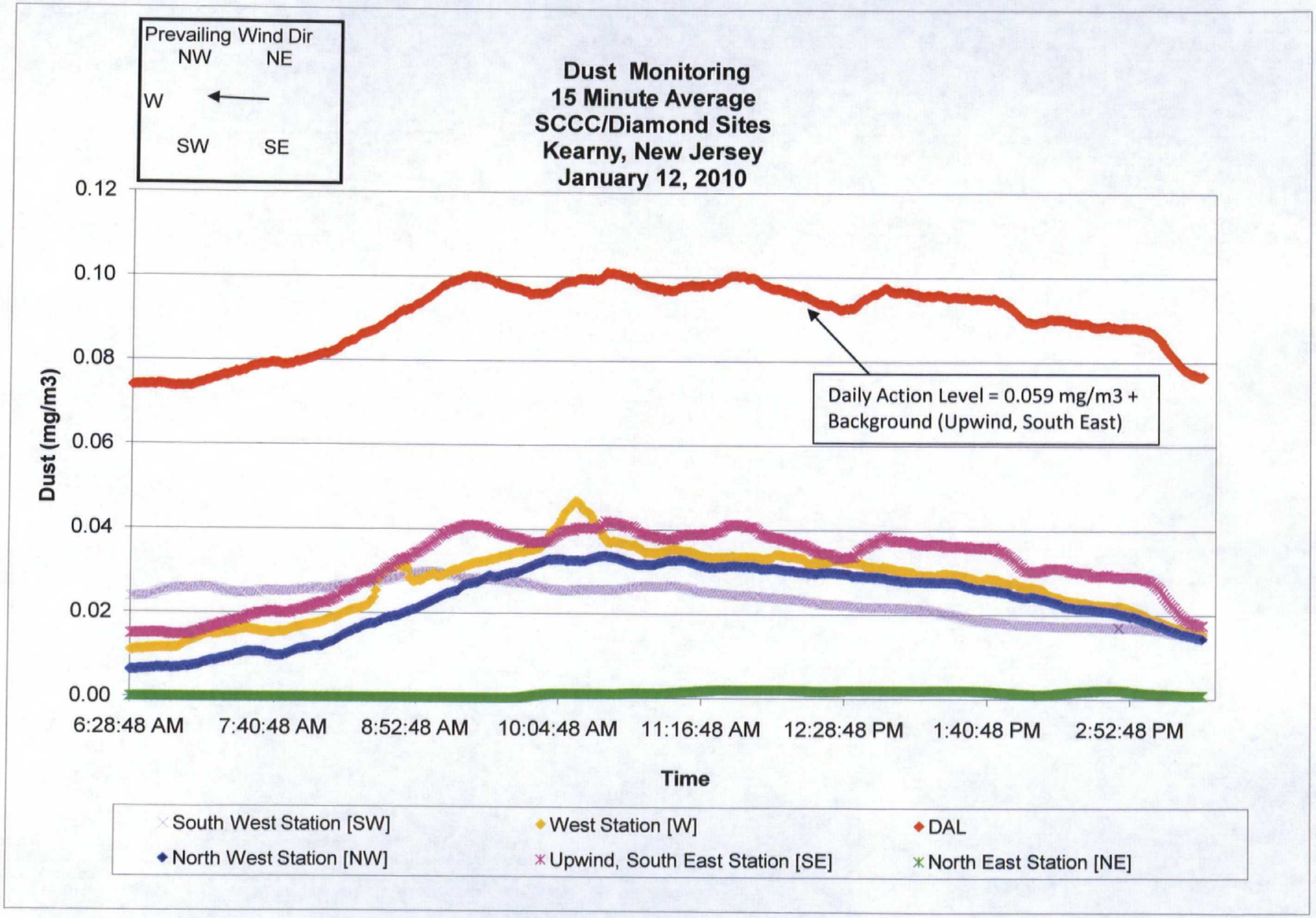
Prevailing Wind Dir
NW
NE
W
SW
SE
VOCs Monitoring
15 Minute Average
SCCC/Diamond Sites
Kearny, New Jersey
January 10, 2011
Daily Action Level = 39 ppb + Background
(Upwind, South East)
VOCs (ppb)
45
40
35
30
25
20
15
10
5
0
6:28:48 AM
7:40:48 AM
8:52:48 AM
10:04:48 AM
11:16:48 AM
12:28:48 PM
1:40:48 PM
2:52:48 PM
Time
North West Station [NW]
Upwind, South East Station [SE]
South West Station [SW]
West Station [W]
North East Station [NE]
DAL

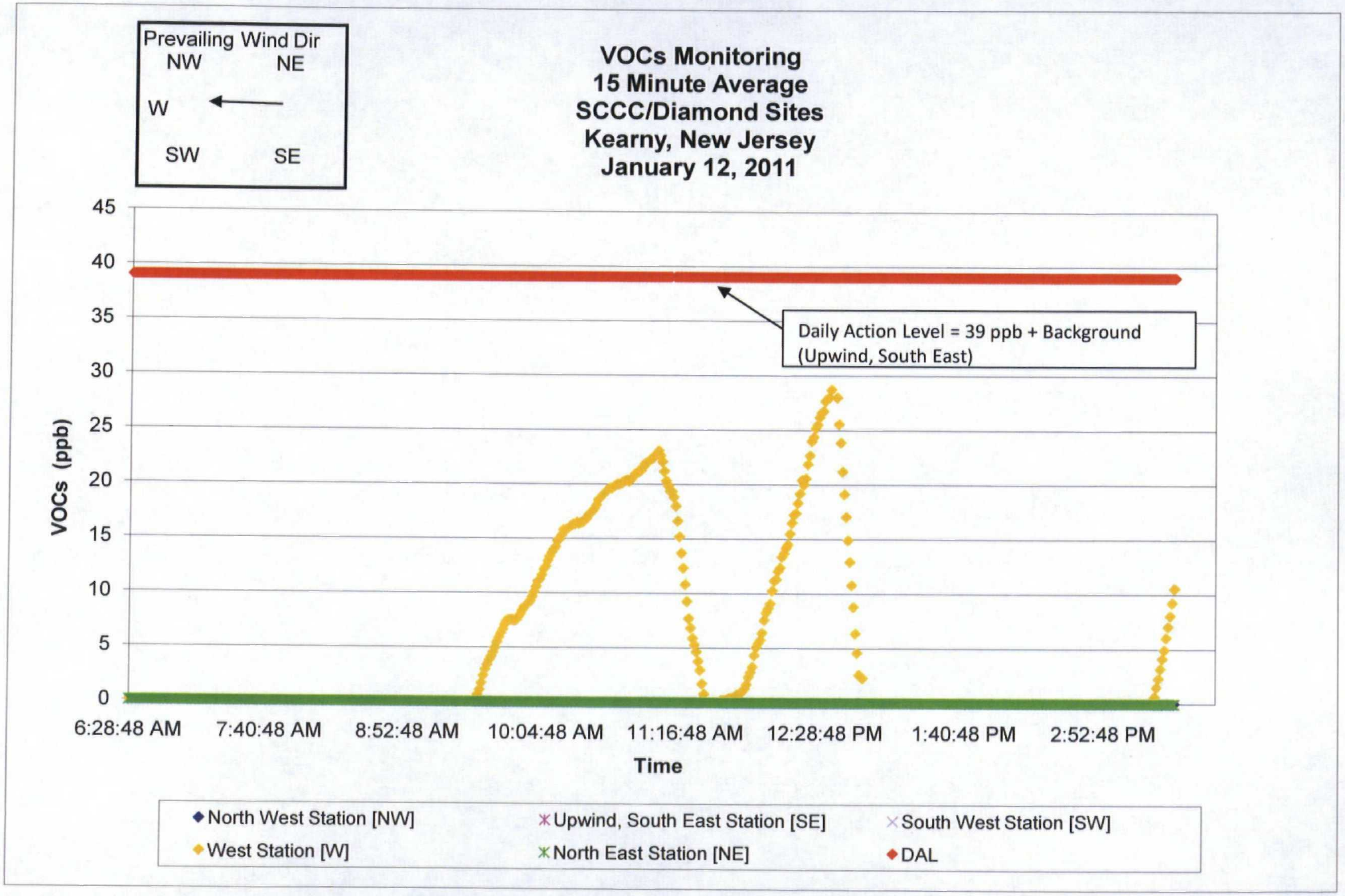


Prevailing Wind Dir
NW
NE
W
SW
SE
Dust Monitoring
15 Minute Average
SCCC/Diamond Sites
Kearny, New Jersey
January 11, 2010
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
Dust (mg/m3)
Daily Action Level = 0.059 mg/m3 + Background (Upwind, South East)
6:28:48 AM
7:40:48 AM
8:52:48 AM
10:04:48 AM
11:16:48 AM
12:28:48 PM
1:40:48 PM
2:52:48 PM
4:04:48 PM
Time
South West Station [SW]
West Station [W]
DAL
North West Station [NW]
Upwind, South East Station [SE]
North East Station [NE]

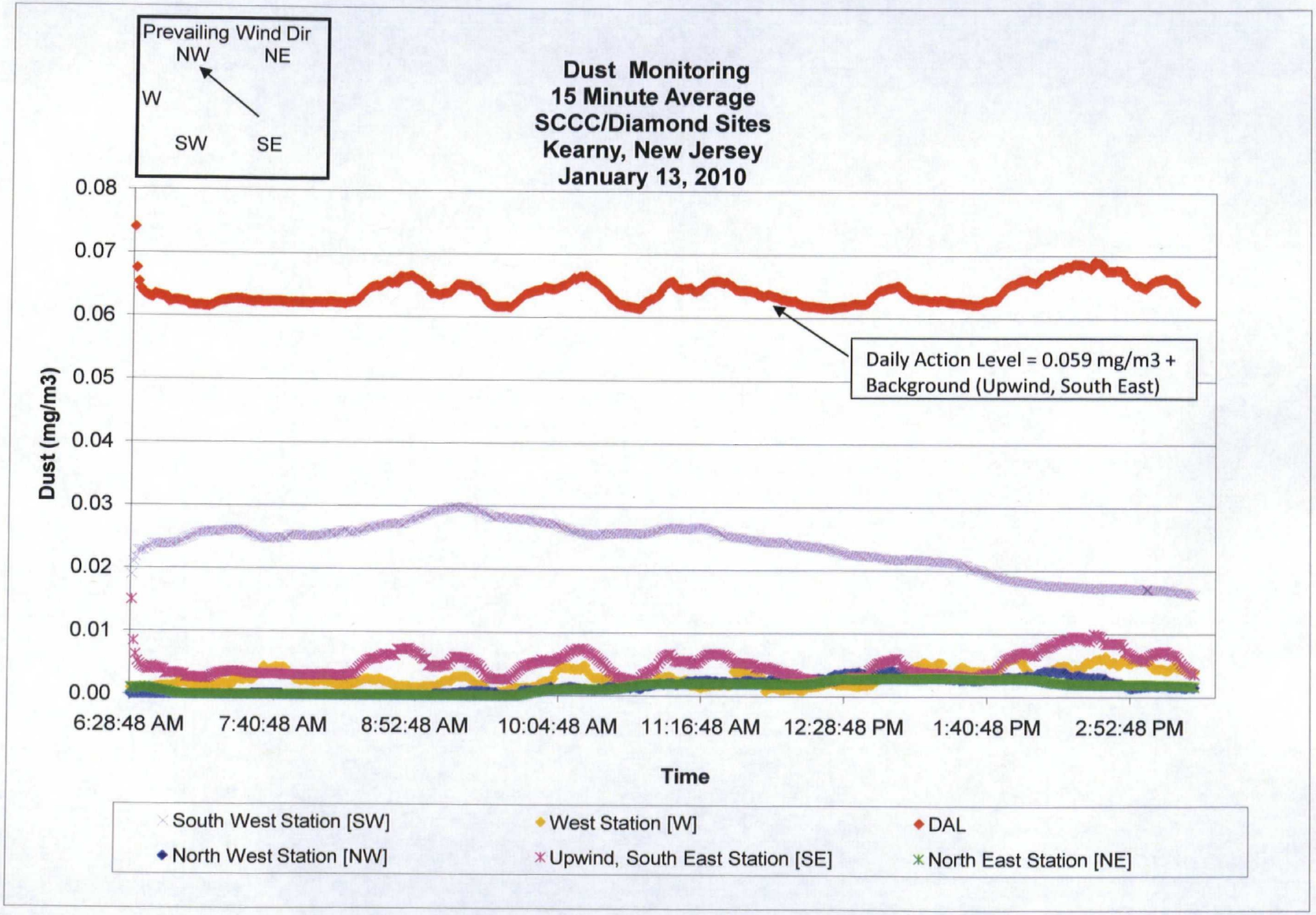


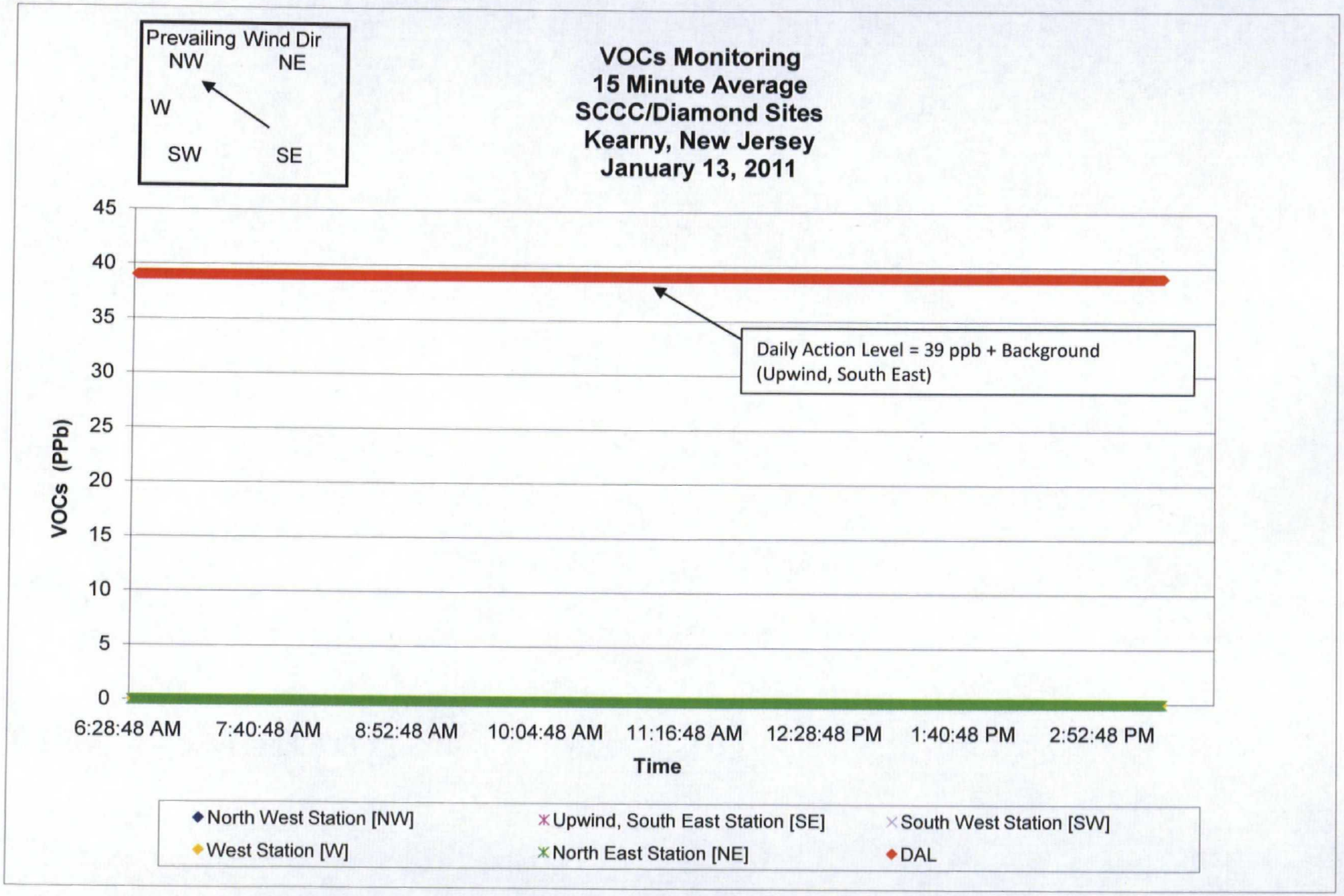
Prevailing Wind Dir
NW
NE
W
SW
SE
VOCs Monitoring
15 Minute Average
SCCC/Diamond Sites
Kearny, New Jersey
January 11, 2011
Daily Action Level = 39 ppb + Background
(Upwind-South East)
VOCs (ppb)
45
40
35
30
25
20
15
10
5
0
6:28:48 AM
7:40:48 AM
8:52:48 AM
10:04:48 AM
11:16:48 AM
12:28:48 PM
1:40:48 PM
2:52:48 PM
Time
North West Station [NW]
Upwind, South East Station [SE]
South West Station [SW]
West Station [W]
North East Station [NE]
DAL


Prevailing Wind Dir
NW
NE
W
SW
SE
Dust Monitoring
15 Minute Average
SCCC/Diamond Sites
Kearny, New Jersey
January 12, 2010
Dust (mg/m3)
0.12
0.10
0.08
0.06
0.04
0.02
0.00
Daily Action Level = 0.059 mg/m3 + Background (Upwind, South East)
6:28:48 AM
7:40:48 AM
8:52:48 AM
10:04:48 AM
11:16:48 AM
12:28:48 PM
1:40:48 PM
2:52:48 PM
Time
South West Station [SW]
West Station [W]
DAL
North West Station [NW]
Upwind, South East Station [SE]
North East Station [NE]

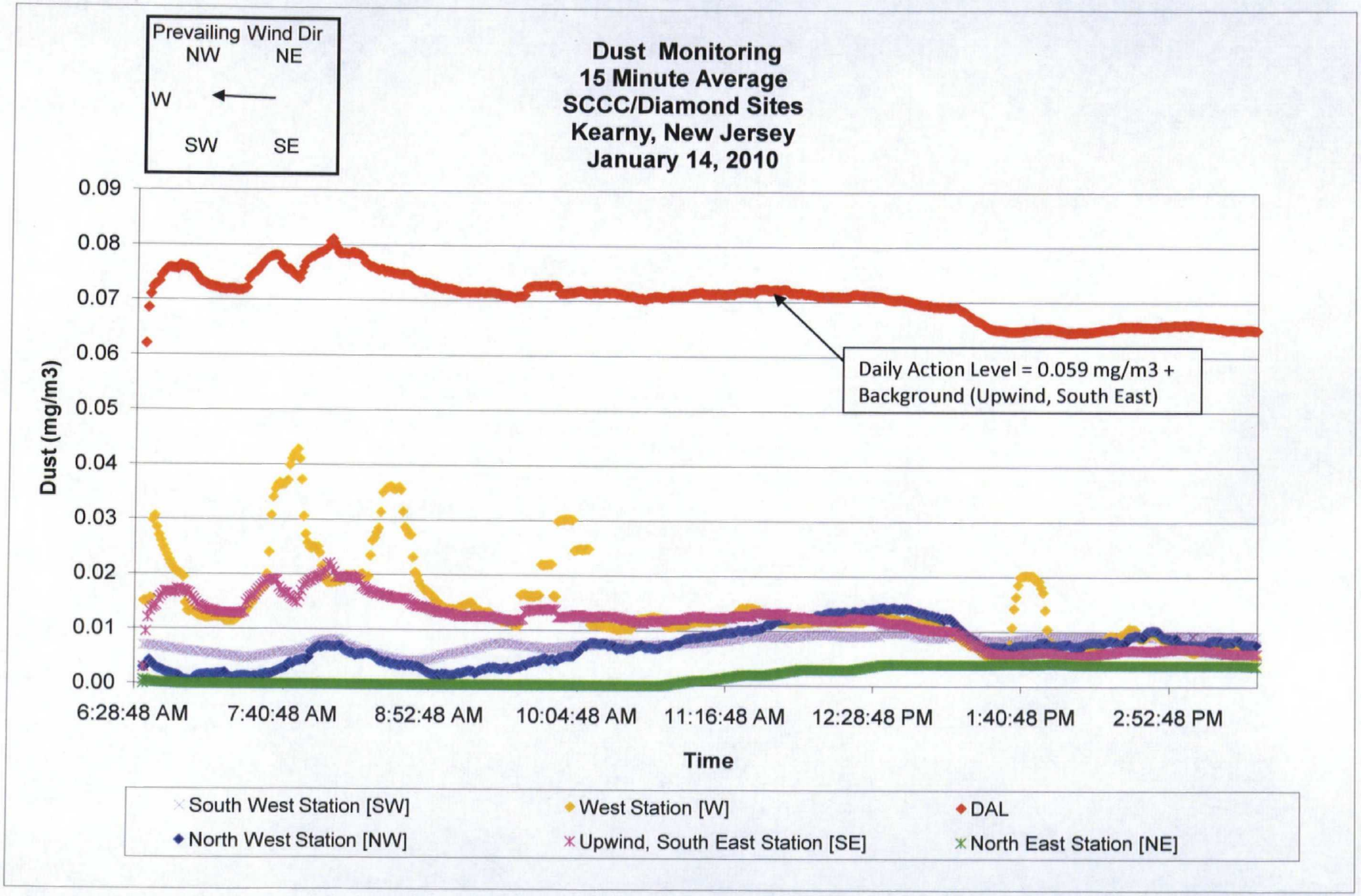


Prevailing Wind Dir
NW
NE
W
SW
SE
VOCs Monitoring
15 Minute Average
SCCC/Diamond Sites
Kearny, New Jersey
January 12, 2011
Daily Action Level = 39 ppb + Background (Upwind, South East)
VOCs (ppb)
45
40
35
30
25
20
15
10
5
0
6:28:48 AM
7:40:48 AM
8:52:48 AM
10:04:48 AM
11:16:48 AM
12:28:48 PM
1:40:48 PM
2:52:48 PM
Time
North West Station [NW]
Upwind, South East Station [SE]
South West Station [SW]
West Station [W]
North East Station [NE]
DAL

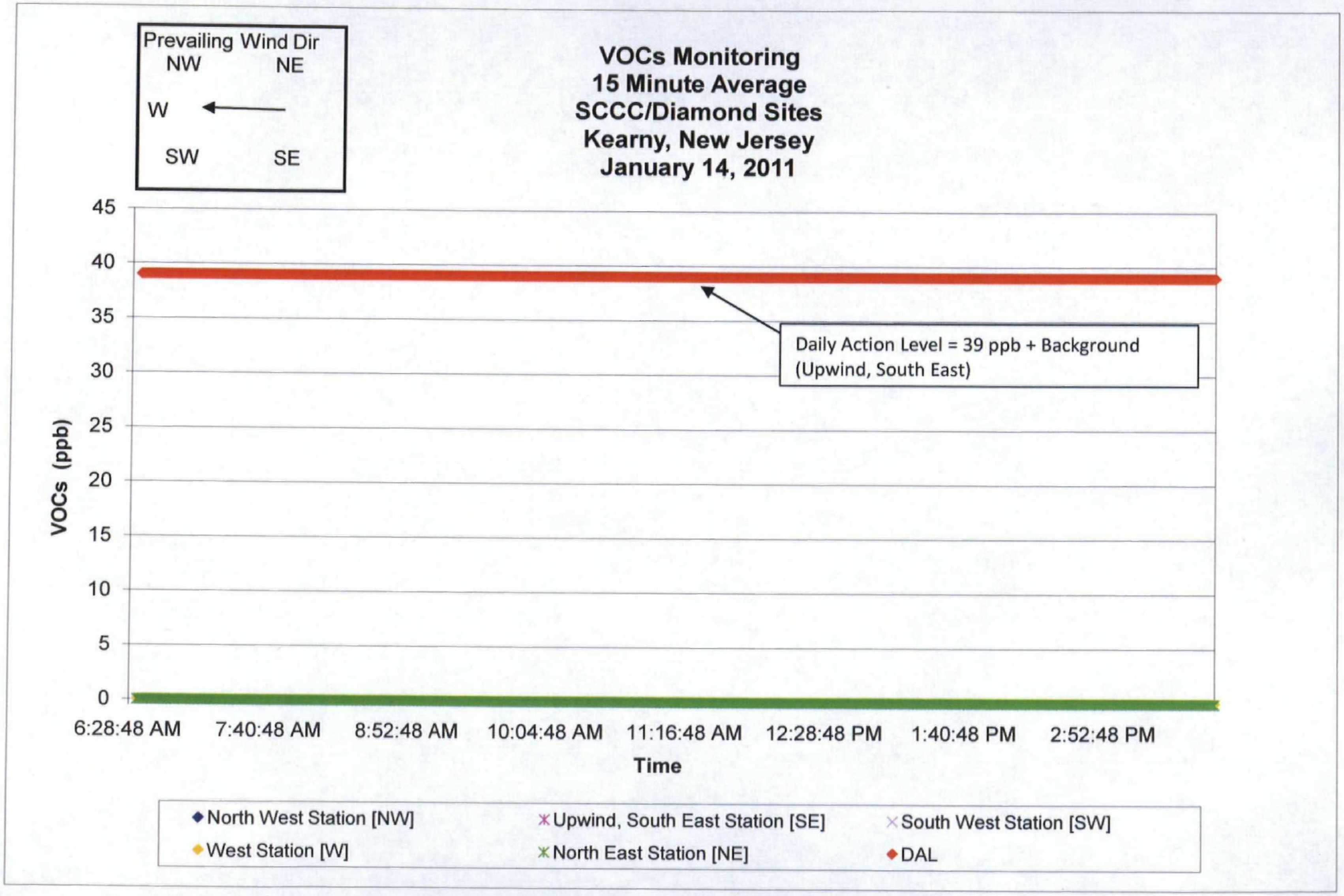

Prevailing Wind Dir
NW
NE
W
SW
SE
Dust Monitoring
15 Minute Average
SCCC/Diamond Sites
Kearny, New Jersey
January 13, 2010
Dust (mg/m3)
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
Daily Action Level = 0.059 mg/m3 + Background (Upwind, South East)
6:28:48 AM
7:40:48 AM
8:52:48 AM
10:04:48 AM
11:16:48 AM
12:28:48 PM
1:40:48 PM
2:52:48 PM
Time
South West Station [SW]
West Station [W]
DAL
North West Station [NW]
Upwind, South East Station [SE]
North East Station [NE]



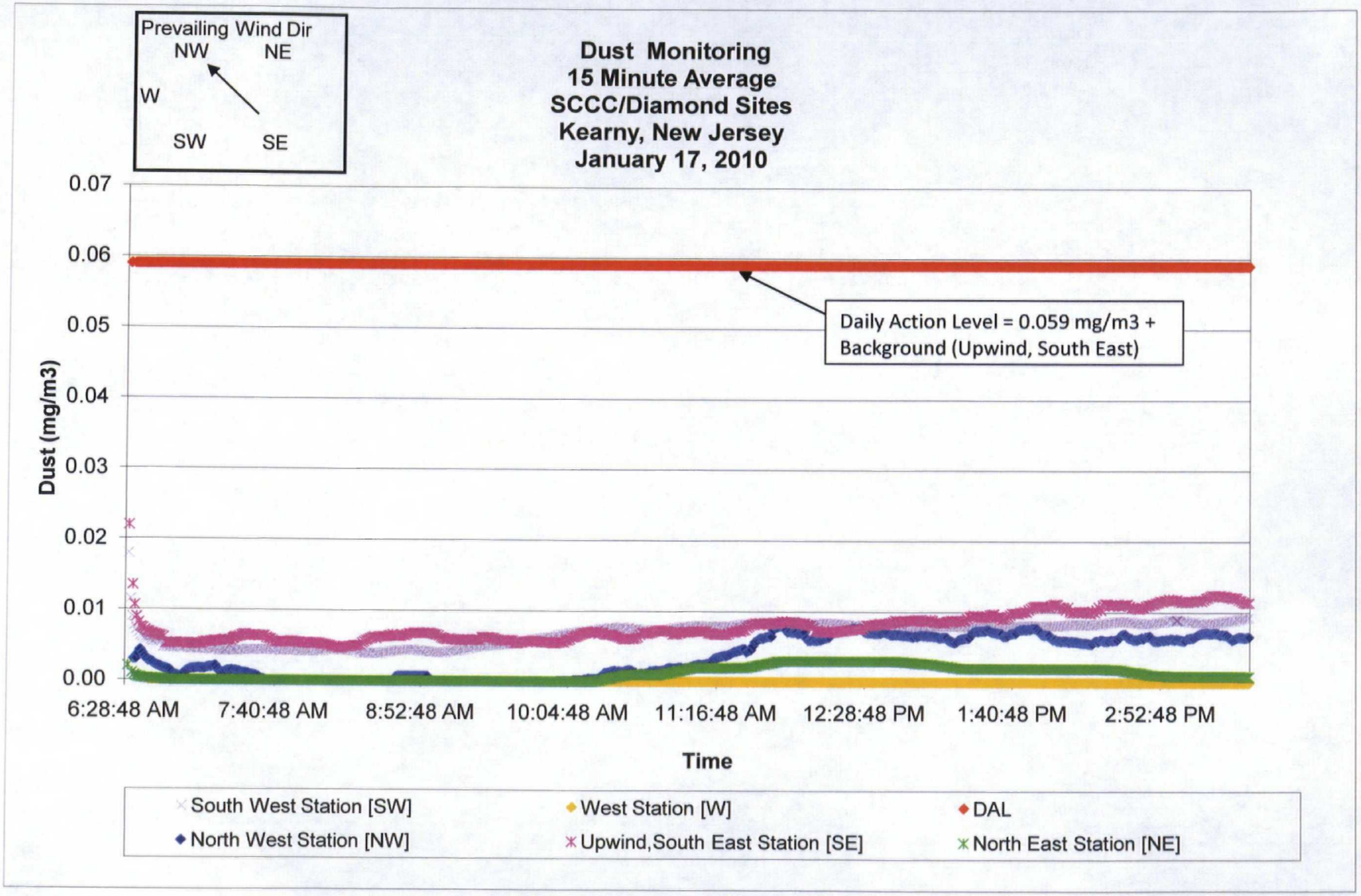
Prevailing Wind Dir
NW
NE
W
SW
SE
VOCs Monitoring
15 Minute Average
SCCC/Diamond Sites
Kearny, New Jersey
January 13, 2011
Daily Action Level = 39 ppb + Background
(Upwind, South East)
VOCs (PPb)
45
40
35
30
25
20
15
10
5
0
6:28:48 AM
7:40:48 AM
8:52:48 AM
10:04:48 AM
11:16:48 AM
12:28:48 PM
1:40:48 PM
2:52:48 PM
Time
North West Station [NW]
Upwind, South East Station [SE]
South West Station [SW]
West Station [W]
North East Station [NE]
DAL



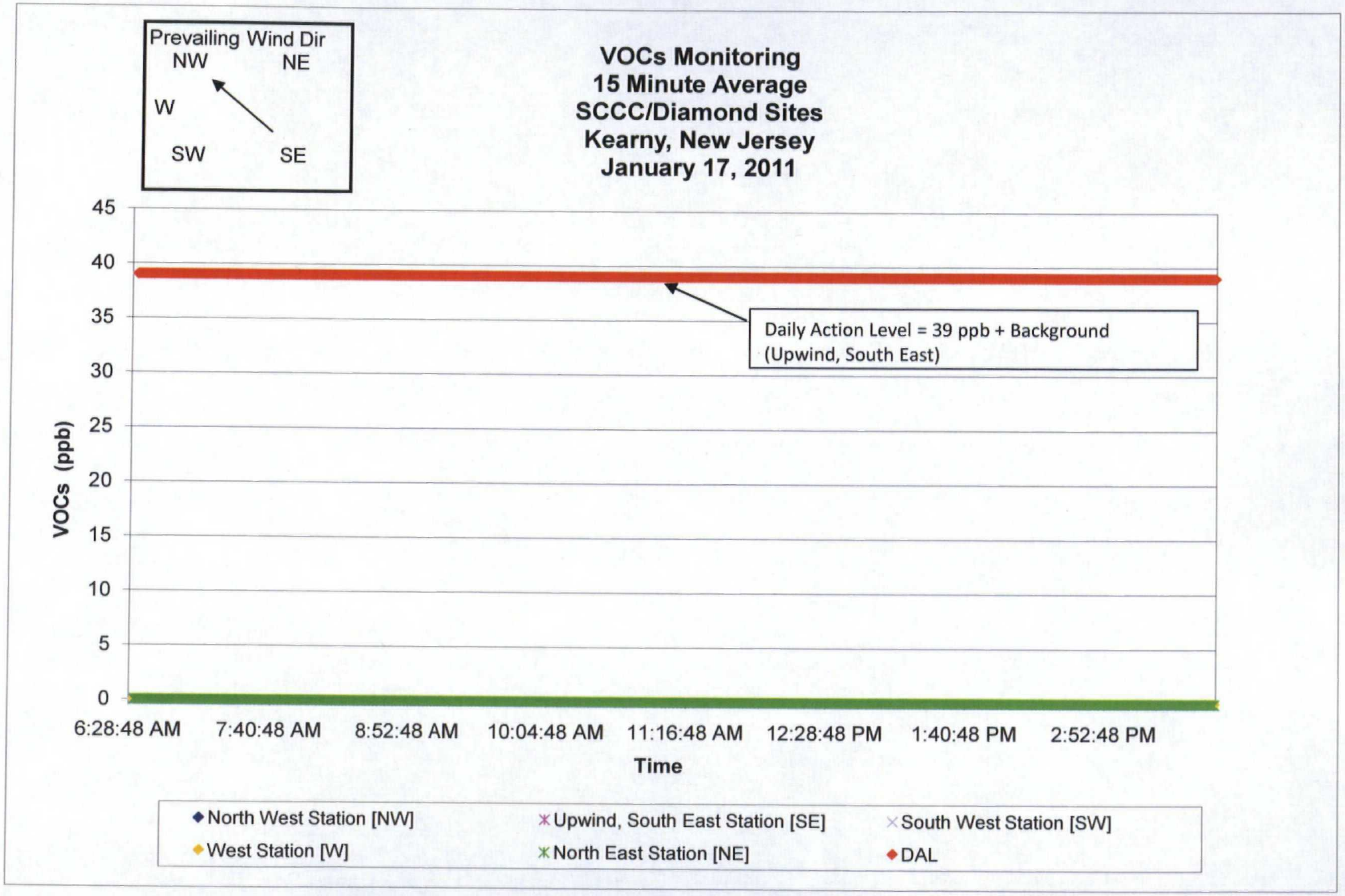
Prevailing Wind Dir
NW
NE
W
SW
SE
Dust Monitoring
15 Minute Average
SCCC/Diamond Sites
Kearny, New Jersey
January 14, 2010
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
Dust (mg/m3)
Daily Action Level = 0.059 mg/m3 + Background (Upwind, South East)
6:28:48 AM
7:40:48 AM
8:52:48 AM
10:04:48 AM
11:16:48 AM
12:28:48 PM
1:40:48 PM
2:52:48 PM
Time
South West Station [SW]
West Station [W]
DAL
North West Station [NW]
Upwind, South East Station [SE]
North East Station [NE]



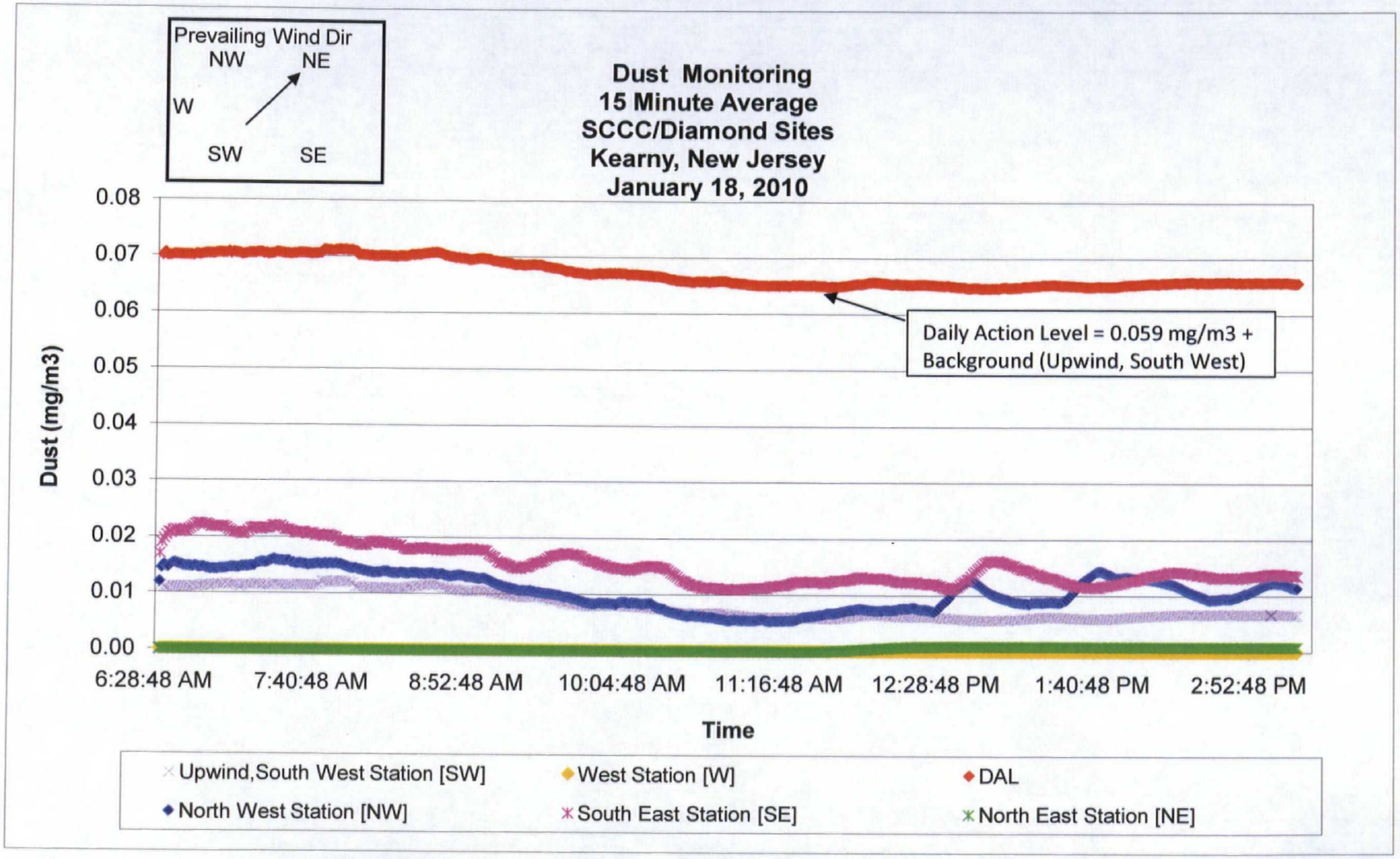
Prevailing Wind Dir
NW
NE
W
SW
SE
VOCs Monitoring
15 Minute Average
SCCC/Diamond Sites
Kearny, New Jersey
January 14, 2011
45
40
35
30
25
20
15
10
5
0
VOCs (ppb)
Daily Action Level = 39 ppb + Background (Upwind, South East)
6:28:48 AM
7:40:48 AM
8:52:48 AM
10:04:48 AM
11:16:48 AM
12:28:48 PM
1:40:48 PM
2:52:48 PM
Time
North West Station [NW]
Upwind, South East Station [SE]
South West Station [SW]
West Station [W]
North East Station [NE]
DAL



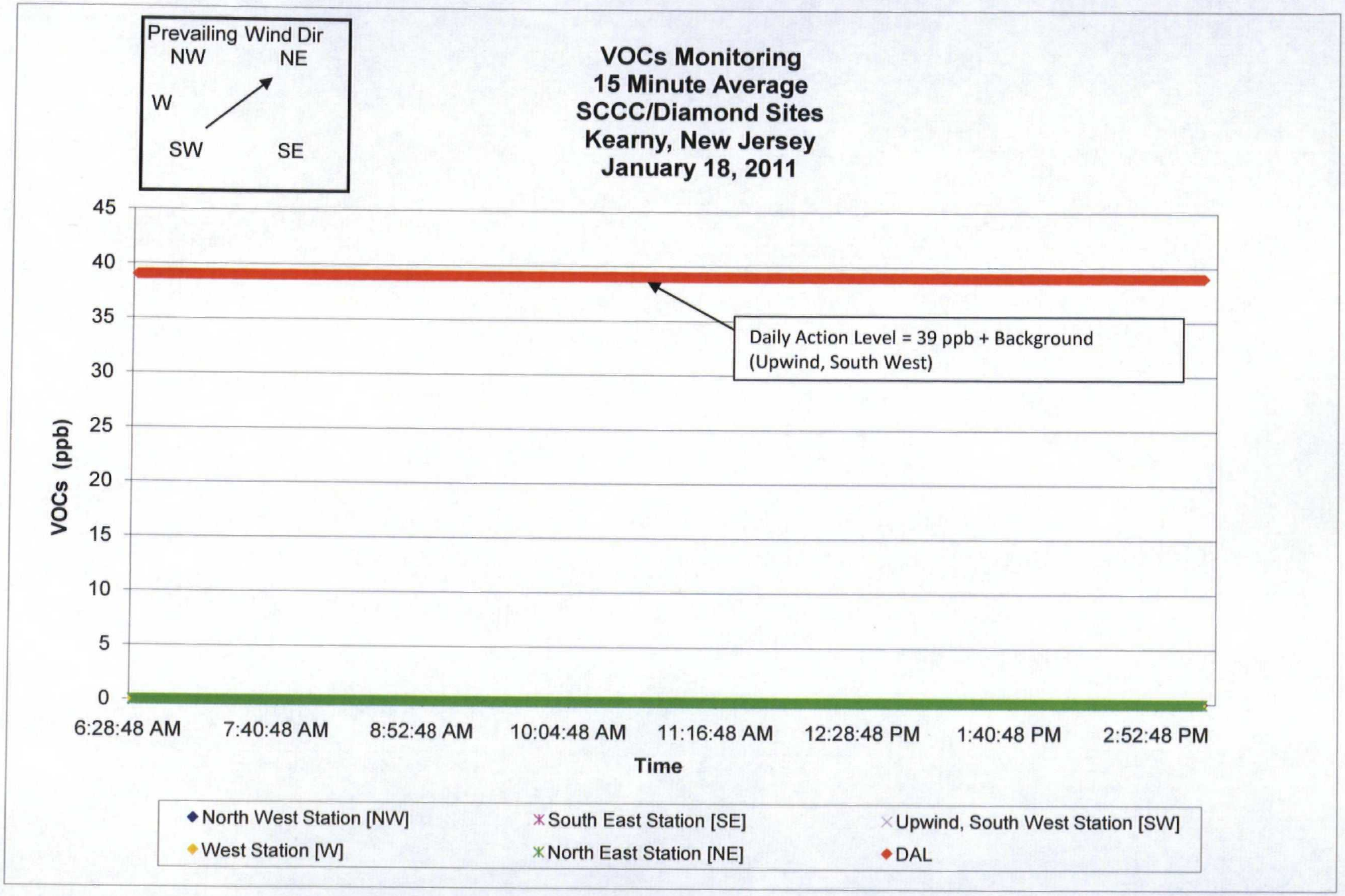
Prevailing Wind Dir
NW
NE
W
SW
SE
Dust Monitoring
15 Minute Average
SCCC/Diamond Sites
Kearny, New Jersey
January 17, 2010
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
Dust (mg/m3)
Daily Action Level = 0.059 mg/m3 + Background (Upwind, South East)
6:28:48 AM
7:40:48 AM
8:52:48 AM
10:04:48 AM
11:16:48 AM
12:28:48 PM
1:40:48 PM
2:52:48 PM
Time
South West Station [SW]
West Station [W]
DAL
North West Station [NW]
Upwind, South East Station [SE]
North East Station [NE]



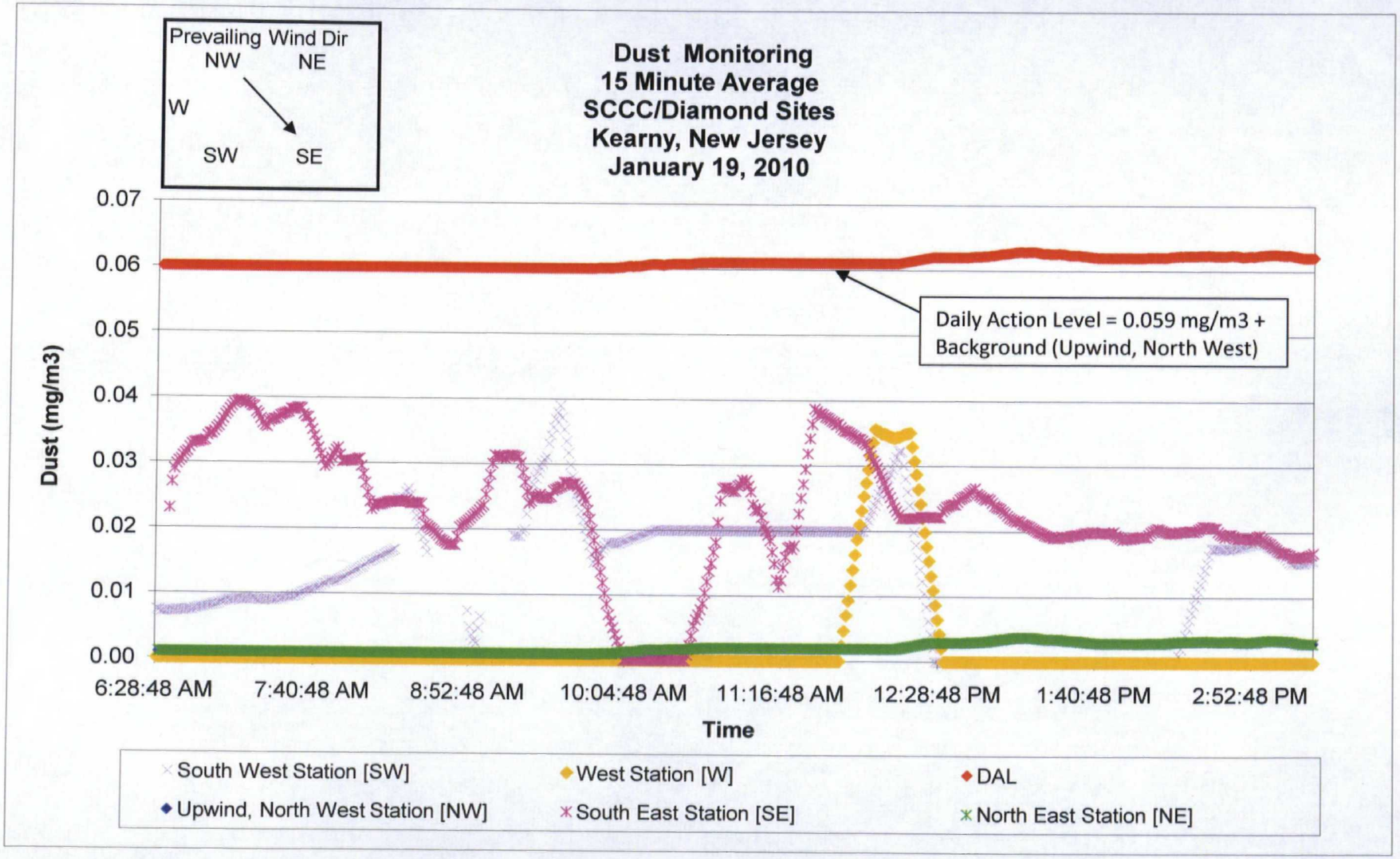
Prevailing Wind Dir
NW
NE
W
SW
SE
VOCs Monitoring
15 Minute Average
SCCC/Diamond Sites
Kearny, New Jersey
January 17, 2011
Daily Action Level = 39 ppb + Background
(Upwind, South East)
VOCs (ppb)
45
40
35
30
25
20
15
10
5
0
6:28:48 AM
7:40:48 AM
8:52:48 AM
10:04:48 AM
11:16:48 AM
12:28:48 PM
1:40:48 PM
2:52:48 PM
Time
North West Station [NW]
Upwind, South East Station [SE]
South West Station [SW]
West Station [W]
North East Station [NE]
DAL



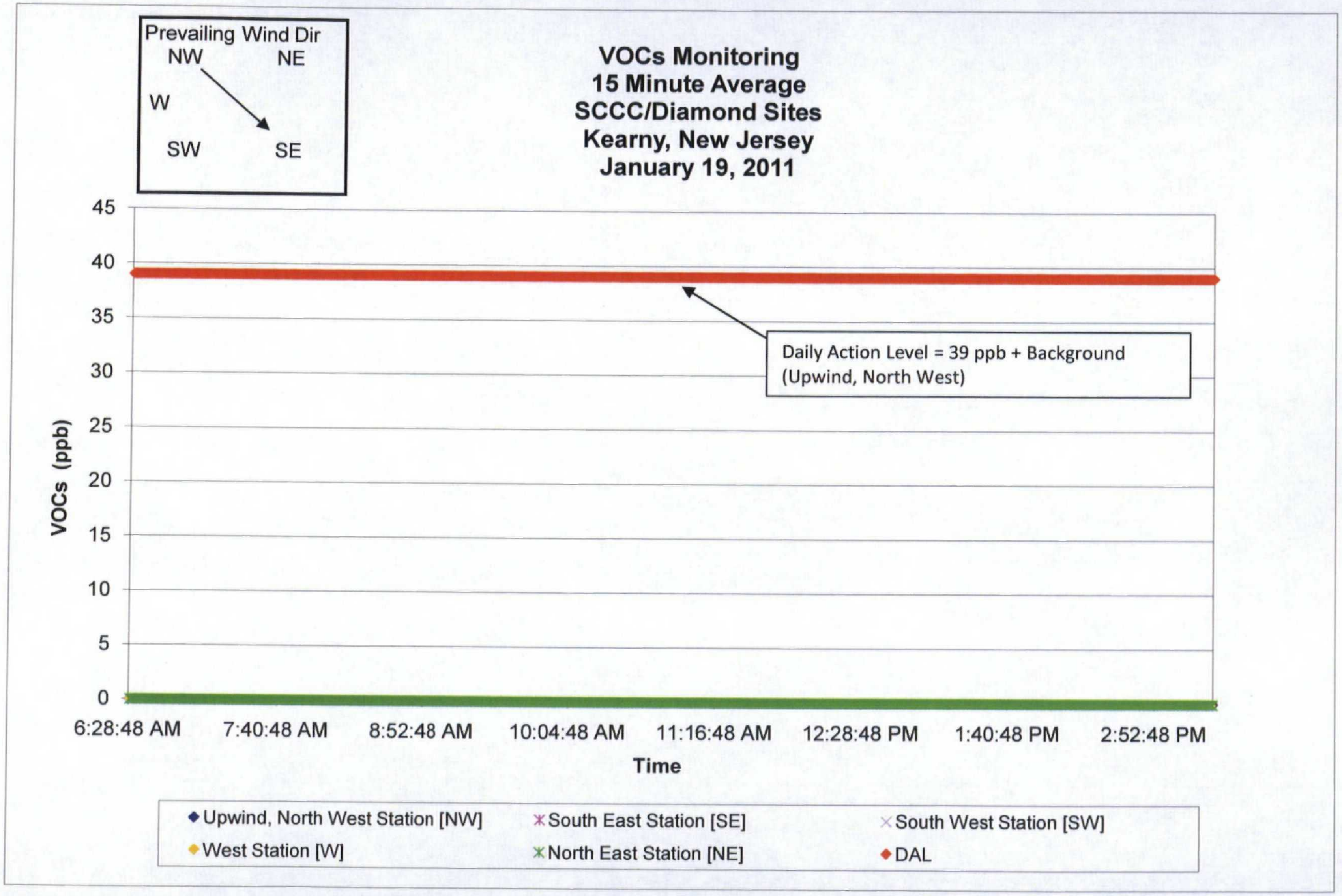
Prevailing Wind Dir
NW
NE
W
SW
SE
Dust Monitoring
15 Minute Average
SCCC/Diamond Sites
Kearny, New Jersey
January 18, 2010
Dust (mg/m3)
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
Daily Action Level = 0.059 mg/m3 + Background (Upwind, South West)
6:28:48 AM
7:40:48 AM
8:52:48 AM
10:04:48 AM
11:16:48 AM
12:28:48 PM
1:40:48 PM
2:52:48 PM
Time
Upwind,South West Station [SW]
West Station [W]
DAL
North West Station [NW]
South East Station [SE]
North East Station [NE]

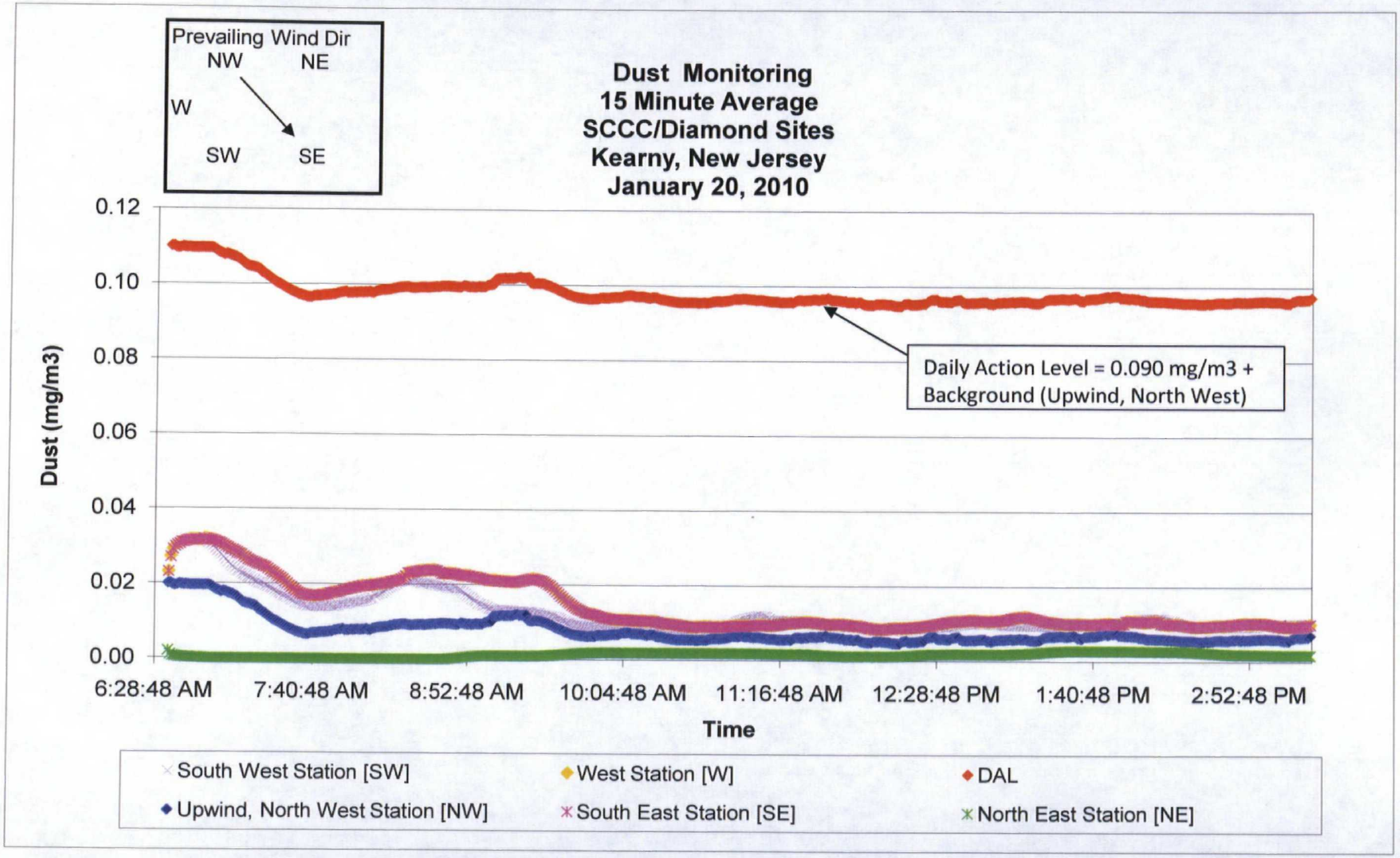


Prevailing Wind Dir
NW
NE
W
SW
SE
VOCs Monitoring
15 Minute Average
SCCC/Diamond Sites
Kearny, New Jersey
January 18, 2011
Daily Action Level = 39 ppb + Background (Upwind, South West)
VOCs (ppb)
45
40
35
30
25
20
15
10
5
0
6:28:48 AM
7:40:48 AM
8:52:48 AM
10:04:48 AM
11:16:48 AM
12:28:48 PM
1:40:48 PM
2:52:48 PM
Time
North West Station [NW]
South East Station [SE]
Upwind, South West Station [SW]
West Station [W]
North East Station [NE]
DAL

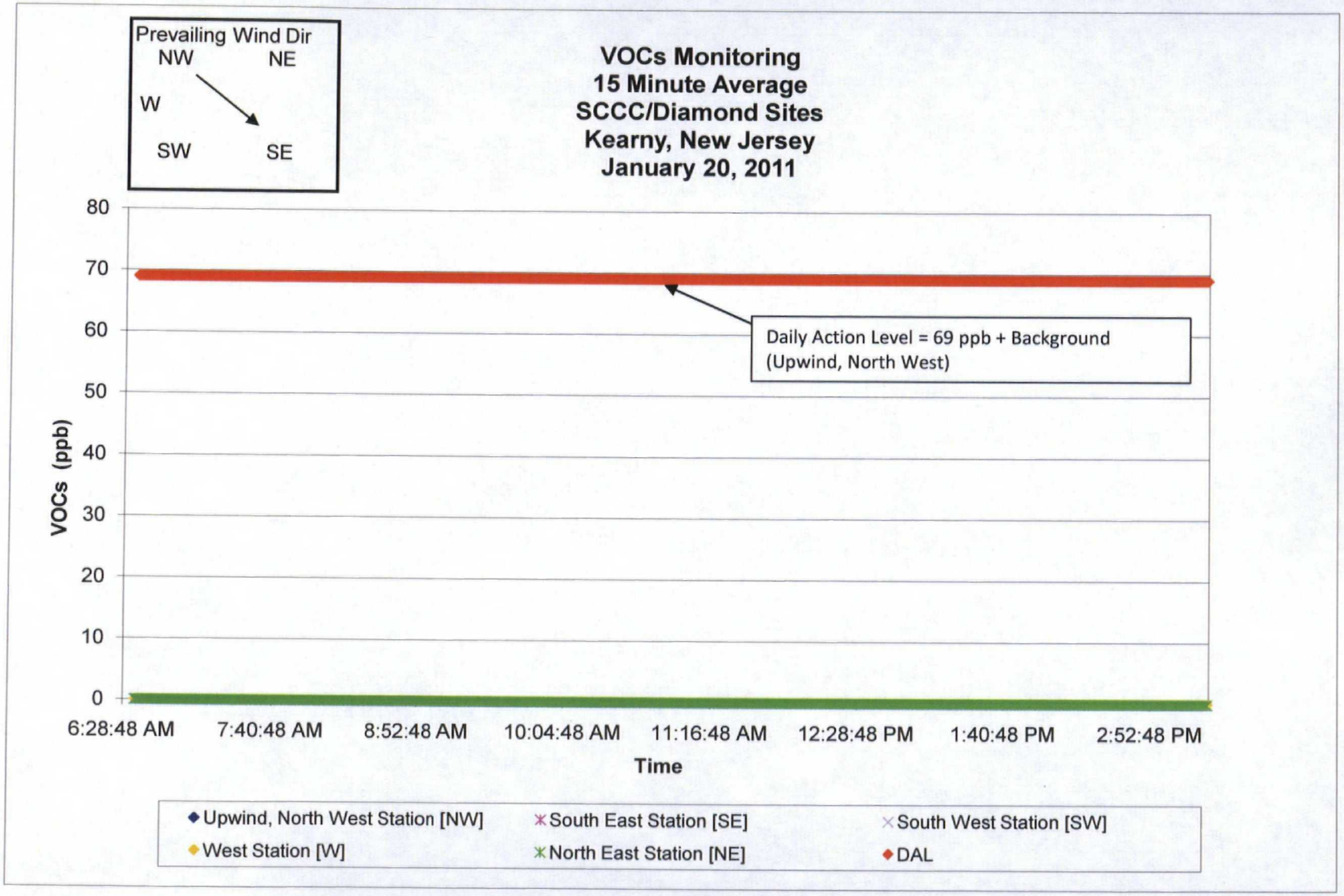


Prevailing Wind Dir
NW
NE
W
SW
SE
Dust Monitoring
15 Minute Average
SCCC/Diamond Sites
Kearny, New Jersey
January 19, 2010
Daily Action Level = 0.059 mg/m3 + Background (Upwind, North West)
Dust (mg/m3)
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
6:28:48 AM
7:40:48 AM
8:52:48 AM
10:04:48 AM
11:16:48 AM
12:28:48 PM
1:40:48 PM
2:52:48 PM
Time
South West Station [SW]
West Station [W]
DAL
Upwind, North West Station [NW]
South East Station [SE]
North East Station [NE]

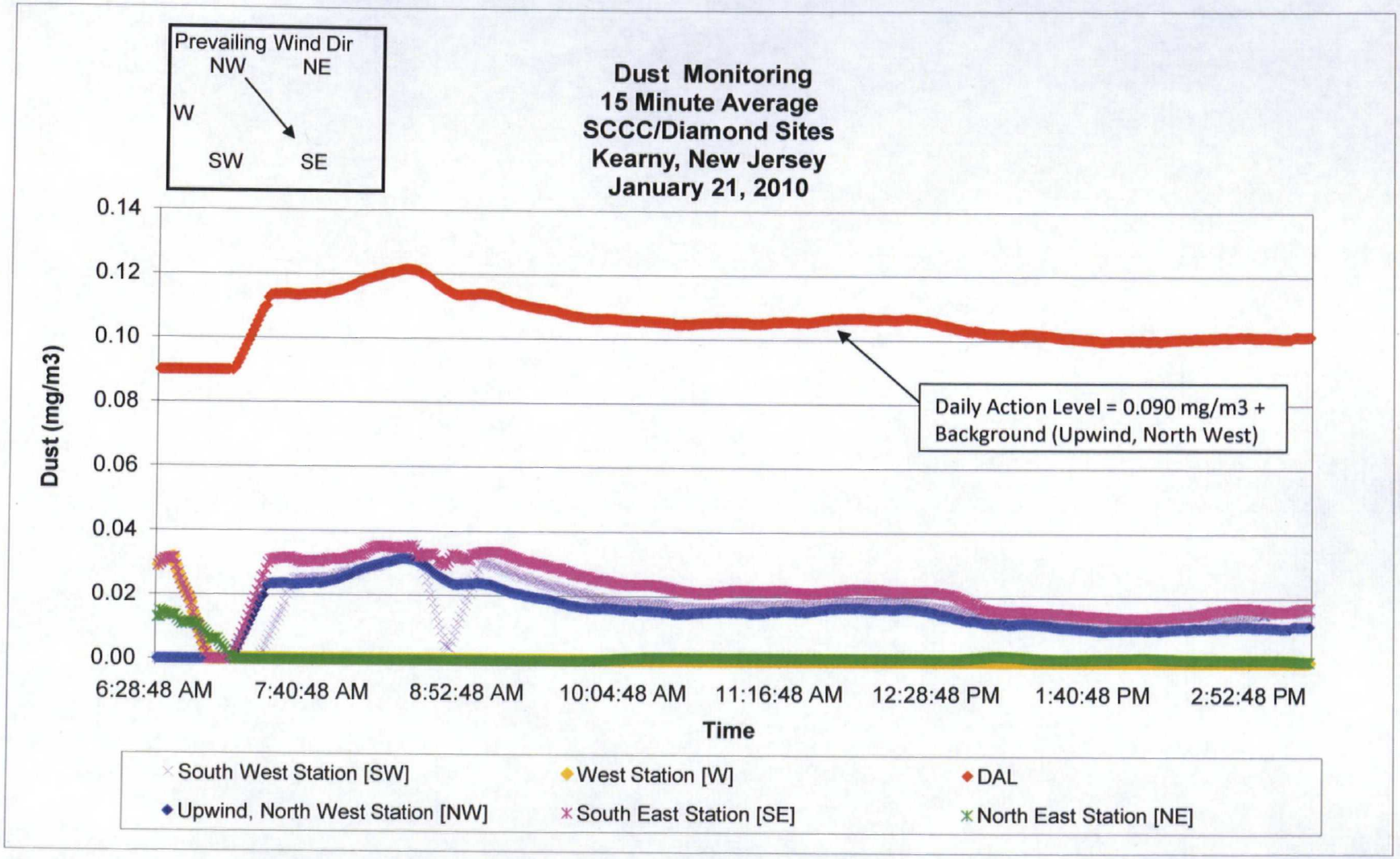

Prevailing Wind Dir
NW
NE
W
SW
SE
VOCs Monitoring
15 Minute Average
SCCC/Diamond Sites
Kearny, New Jersey
January 19, 2011
Daily Action Level = 39 ppb + Background
(Upwind, North West)
VOCs (ppb)
45
40
35
30
25
20
15
10
5
0
6:28:48 AM
7:40:48 AM
8:52:48 AM
10:04:48 AM
11:16:48 AM
12:28:48 PM
1:40:48 PM
2:52:48 PM
Time
Upwind, North West Station [NW]
South East Station [SE]
South West Station [SW]
West Station [W]
North East Station [NE]
DAL

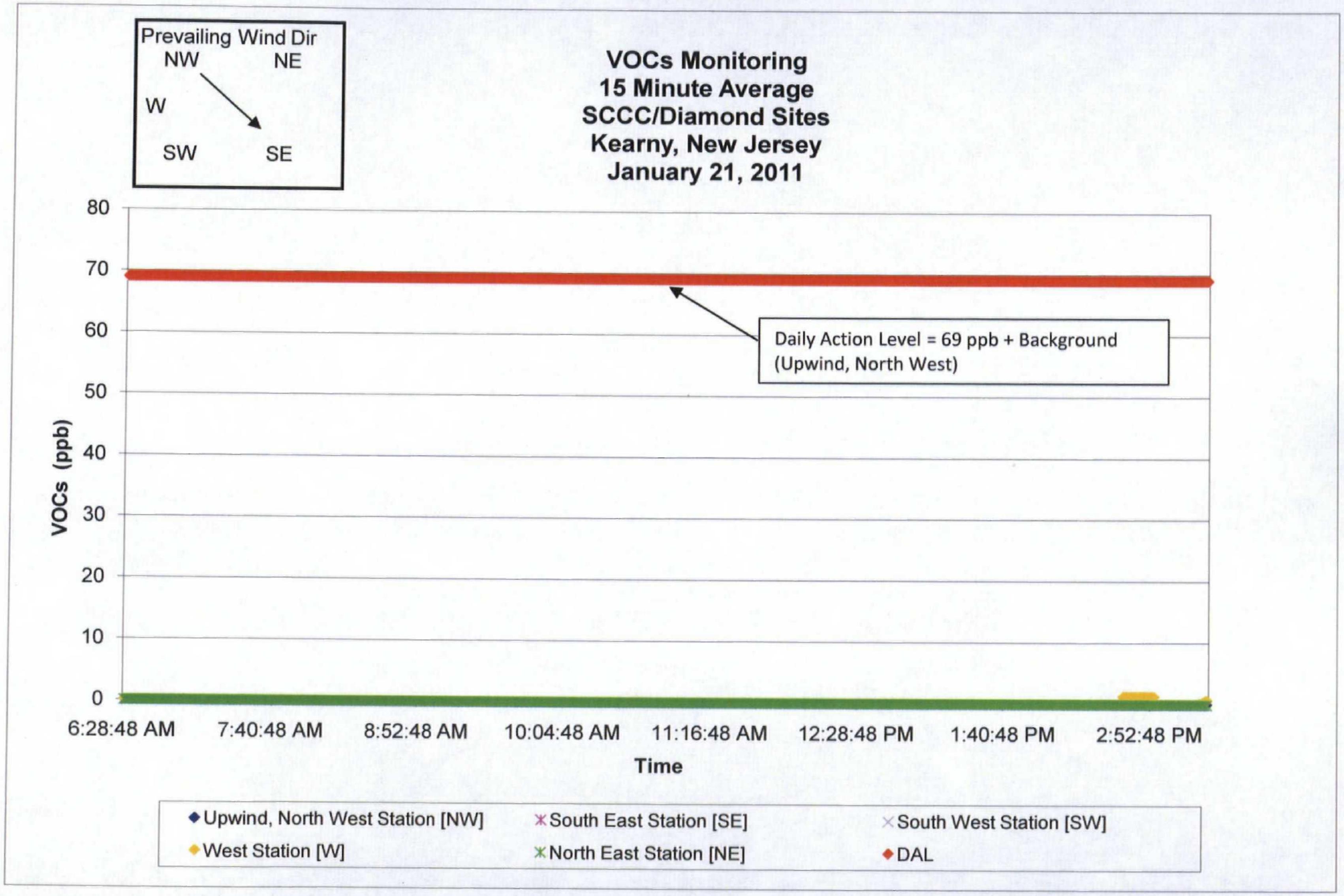


Prevailing Wind Dir
NW
NE
W
SW
SE
Dust Monitoring
15 Minute Average
SCCC/Diamond Sites
Kearny, New Jersey
January 20, 2010
Dust (mg/m3)
0.12
0.10
0.08
0.06
0.04
0.02
0.00
Daily Action Level = 0.090 mg/m3 + Background (Upwind, North West)
6:28:48 AM
7:40:48 AM
8:52:48 AM
10:04:48 AM
11:16:48 AM
12:28:48 PM
1:40:48 PM
2:52:48 PM
Time
South West Station [SW]
West Station [W]
DAL
Upwind, North West Station [NW]
South East Station [SE]
North East Station [NE]



Prevailing Wind Dir
NW
NE
W
SW
SE
VOCs Monitoring
15 Minute Average
SCCC/Diamond Sites
Kearny, New Jersey
January 20, 2011
80
70
60
50
40
30
20
10
0
VOCs (ppb)
Daily Action Level = 69 ppb + Background
(Upwind, North West)
6:28:48 AM
7:40:48 AM
8:52:48 AM
10:04:48 AM
11:16:48 AM
12:28:48 PM
1:40:48 PM
2:52:48 PM
Time
Upwind, North West Station [NW]
South East Station [SE]
South West Station [SW]
West Station [W]
North East Station [NE]
DAL


Prevailing Wind Dir
NW
NE
W
SW
SE
Dust Monitoring
15 Minute Average
SCCC/Diamond Sites
Kearny, New Jersey
January 21, 2010
Dust (mg/m3)
0.14
0.12
0.10
0.08
0.06
0.04
0.02
0.00
Daily Action Level = 0.090 mg/m3 + Background (Upwind, North West)
6:28:48 AM
7:40:48 AM
8:52:48 AM
10:04:48 AM
11:16:48 AM
12:28:48 PM
1:40:48 PM
2:52:48 PM
Time
South West Station [SW]
West Station [W]
DAL
Upwind, North West Station [NW]
South East Station [SE]
North East Station [NE]



Prevailing Wind Dir
NW
NE
W
SW
SE
VOCs Monitoring
15 Minute Average
SCCC/Diamond Sites
Kearny, New Jersey
January 21, 2011
80
70
60
50
40
30
20
10
0
VOCs (ppb)
Daily Action Level = 69 ppb + Background
(Upwind, North West)
6:28:48 AM
7:40:48 AM
8:52:48 AM
10:04:48 AM
11:16:48 AM
12:28:48 PM
1:40:48 PM
2:52:48 PM
Time
Upwind, North West Station [NW]
South East Station [SE]
South West Station [SW]
West Station [W]
North East Station [NE]
DAL

APPENDIX B.2

PERSONAL AIR MONITORING RESULTS

AIR SAMPLING RESULTS
SCCC/DIAMOND SITE
KEARNY, NEW JERSEY
March 22, 2011

PARAMETER	Units	Staff Engineer - 1	Staff Engineer - 2	Staff Geologist	Sr. Hydrogeo logist	Staff Scientist	Field Blank (Total ug)	OHSA PEL
PAHs								
1-Nitropyrene	mg/m^3	<0.0003	<0.0004	<0.0005	<0.0005	<0.0004	<0.4	NA
Acenaphthene	mg/m^3	<0.0005	<0.0006	<0.0007	<0.0007	<0.0006	<0.3	NA
Acenaphthylene	mg/m^3	<0.0005	<0.0005	<0.0007	<0.0007	<0.0005	<0.3	NA
Anthracene	mg/m^3	<0.0005	<0.0005	<0.0007	<0.0006	<0.0005	<0.4	NA
Benzo (a) anthracene	mg/m^3	<0.0004	<0.0004	<0.0006	<0.0006	<0.0004	<0.4	NA
Benzo (a) pyrene	mg/m^3	<0.0004	<0.0005	<0.0006	<0.0006	<0.0005	<0.5	0.2
Benzo (b) fluoranthene	mg/m^3	<0.0004	<0.0004	<0.0005	<0.0005	<0.0004	<0.4	NA
Benzo (e) pyrene	mg/m^3	<0.0004	<0.0004	<0.0006	<0.0006	<0.0005	<0.4	NA
Benzo (g, h, i) perlene	mg/m^3	<0.0004	<0.0005	<0.0006	<0.0006	<0.0005	<0.5	NA
Benzo (k) fluoranthene	mg/m^3	<0.0004	<0.0004	<0.0005	<0.0005	<0.0004	<0.4	NA
Chrysene	mg/m^3	<0.0004	<0.0004	<0.0006	<0.0006	<0.0004	<0.4	0.2
Dibenzo (a, h) anthracene	mg/m^3	<0.0004	<0.0004	<0.0005	<0.0005	<0.0004	<0.4	NA
Fluoranthene	mg/m^3	<0.0004	<0.0005	<0.0006	<0.0006	<0.0005	<0.4	NA
Fluorene	mg/m^3	<0.0005	<0.0005	<0.0007	<0.0007	<0.0005	<0.3	NA
Indeno (1,2,3-cd) pyrene	mg/m^3	<0.0004	<0.0004	<0.0006	<0.0006	<0.0004	<0.5	NA
Naphthalene	ppm	0.0011	<0.0006	0.00081	0.0002	0.00065	<0.3	10
Phenanthrene	mg/m^3	<0.0005	<0.0005	<0.0006	<0.0006	<0.0005	<0.3	NA
Pyrene	mg/m^3	<0.0004	<0.0005	<0.0006	<0.0006	<0.0005	<0.4	NA

PARAMETER	Units	Staff Engineer - 1	Staff Engineer - 2	Staff Geologist – 1	Sr. Hydrogeo logist	Staff Scientist	Field Blank (Total ug)	OHSA PEL
VOCs								
Methyl chloroform	ppm	<0.08	<0.08	<0.09	<0.08	<0.09	<5	350
1,1,2-Trichloroethane	ppm	<0.08	<0.08	<0.09	<0.08	<0.09	<5	10
1,1-Dichloroethane	ppm	<0.1	<0.1	<0.1	<0. 1	<0.1	<6	100
1,2-Dichloroethane	ppm	<0.1	<0.1	<0.1	<0.1	<0.1	<5	50
Acetone	ppm	<0.2	<0.2	<0.2	<0.2	<0.2	<6	1,000
Benzene	ppm	<0.05	<0.05	<0.06	<0.05	<0.06	<2	1
Chlorobenzene	ppm	<0.1	<0.1	<0.1	<0. 1	<0.1	<5	75
Chloroform	ppm	<0.09	<0.09	<0.1	<0. 09	<0.1	<5	50 (C)
Cis-1,2-Dichloroethylene	ppm	<0.1	<0.1	<0.1	<0. 1	<0.1	<5	200
Cumene	ppm	<0.09	<0.09	<0.1	<0. 09	<0.1	<5	50
Cyclohexane	ppm	<0.1	<0.1	<0.1	<0. 1	<0.1	<5	200
Cyclohexanone	ppm	<0.1	<0.1	<0.1	<0. 1	<0.1	<5	50
Cyclohenene	ppm	<0.1	<0.1	<0.1	<0. 1	<0.1	<5	300
Ethyl Alcohol	ppm	1.4	<0.2	1.6	1.2	0.86	<5	1,000
Ethylbenzene	ppm	<0.1	<0.1	<0.1	<0. 1	<0.1	<5	100
Isopropyl Alcohol	ppm	<0.2	<0.2	<0.2	<0. 2	<0.2	<5	400
m-Dichlorobenzene	ppm	<0.08	<0.07	<0.08	<0. 08	<0.08	<5	NA
Methyl Ethyl Ketone	ppm	<0.1	<0.1	<0.2	<0. 1	<0.2	<5	200
Methyl Isobutyl Ketone	ppm	<0.1	<0.1	<0.1	<0. 1	<0.1	<5	100
Methyl n-Propyl Ketone	ppm	<0.1	<0.1	<0.1	<0. 1	<0.1	<5	200
Methylene Chloride	ppm	<0.1	<0.1	<0.1	<0. 1	<0.1	<5	25
n-Butyl Acetate	ppm	<0.1	<0.09	<0.1	<0. 1	<0.1	<5	150
n-Hexane	ppm	<0.1	<0.1	<0.1	<0. 1	<0.1	<5	500
n-Propyl Acetate	ppm	<0.1	<0.1	<0.1	<0. 1	<0.1	<5	200
o-Dichlorobenzene	ppm	<0.08	<0.08	<0.09	<0. 08	<0.08	<5	50 (C)
p-Dichlorobenzene	ppm	<0.08	<0.08	<0.09	<0. 08	<0.08	<5	75
Pentane	ppm	<0.1	<0.1	<0.2	<0. 1	<0.2	<5	1,000
Tetrachloroethylene	ppm	<0.07	<0.06	<0.07	<0. 07	<0.07	<5	100
Tetrahydrofuran	ppm	<0.1	<0.1	<0.2	<0. 2	<0.2	<5	200
Toluene	ppm	<0.1	<0.1	<0.1	<0. 1	<0.1	<5	200
Trichloroethylene	ppm	<0.08	<0.08	<0.09	<0. 08	<0.09	<5	100
Vinyl Chloride	ppm	<0.02	<0.02	<0.03	<0. 02	<0.03	<0.7	1
Xylene	ppm	<0.30	<0.29	<0.34	<0. 031	<0.33	<15	100

AIR SAMPLING RESULTS
SCCC/DIAMOND SITE
KEARNY, NEW JERSEY
March 23, 2011

PARAMETER	Units	Staff Geologist – 2	Staff Engineer - 2	Staff Scientist	Field Blank (Total ug)	OSHA PEL
VOCs						
Methyl chloroform	ppm	<0.09	<0.06	<0.07	<5	350
1,1,2-Trichloroethane	ppm	<0.09	<0.06	<0.07	<5	10
1,1-Dichloroethane	ppm	<0.1	<0.09	<0.1	<6	100
1,2-Dichloroethane	ppm	<0.1	<0.08	<0.1	<5	50
Acetone	ppm	<0.2	<0.2	<0.2	<6	1,000
Benzene	ppm	<0.06	<0.04	<0.05	<2	1
Chlorobenzene	ppm	<0.1	<0.07	<0.09	<5	75
Chloroform	ppm	<0.1	<0.07	<0.08	<5	50 (C)
Cis-1,2-Dichloroethylene	ppm	<0.1	<0.08	<0.1	<5	200
Cumene	ppm	<0.1	<0.07	<0.08	<5	50
Cyclohexane	ppm	<0.1	<0.1	<0.1	<5	200
Cyclohexanone	ppm	<0.1	<0.09	<0.1	<5	50
Cyclohenene	ppm	<0.1	<0.1	<0.1	<5	300
Ethyl Alcohol	ppm	<0.3	<0.2	0.3	<5	1,000
Ethylbenzene	ppm	<0.1	<0.08	<0.09	<5	100
Isopropyl Alcohol	ppm	<0.2	<0.1	<0.2	<5	400
m-Dichlorobenzene	ppm	<0.09	<0.06	<0.07	<5	NA
Methyl Ethyl Ketone	ppm	<0.1	<0.1	<0.1	<5	200
Methyl Isobutyl Ketone	ppm	<0.1	<0.08	<0.1	<5	100
Methyl n-Propyl Ketone	ppm	<0.1	<0.1	<0.1	<5	200
Methylene Chloride	ppm	<0.1	<0.09	<0.1	<5	25
n-Butyl Acetate	ppm	<0.1	<0.07	<0.09	<5	150
n-Hexane	ppm	<0.1	<0.1	<0.1	<5	500
n-Propyl Acetate	ppm	<0.1	<0.08	<0.1	<5	200
o-Dichlorobenzene	ppm	<0.09	<0.06	<0.07	<5	50 (C)
p-Dichlorobenzene	ppm	<0.09	<0.06	<0.07	<5	75
Pentane	ppm	<0.2	<0.1	<0.1	<5	1,000
Tetrachloroethylene	ppm	<0.07	<0.05	<0.06	<5	100
Tetrahydrofuran	ppm	<0.2	<0.1	<0.1	<5	200
Toluene	ppm	<0.1	<0.09	<0.1	<5	200
Trichloroethylene	ppm	<0.09	<0.06	<0.07	<5	100
Vinyl Chloride	ppm	<0.03	<0.02	<0.02	<0.7	1
Xylene	ppm	<0.34	<0.23	<0.27	<15	100

AIR SAMPLING RESULTS
SCCC/DIAMOND SITE
KEARNY, NEW JERSEY
March 30 & 31, 2011

Parameter	Units	Staff Geologist – 1	Staff Engineer - 1	Staff Scientist	Field Blank (Total ug)	OSHA PEL
PAHs		**3/30/11**	**3/30/11**	**3/30/11**	**3/30/11**	
1-Nitropyrene	mg/m^3	<0.0001	<0.00008	<0.0001	<0.4	NA
Acenaphthene	mg/m^3	<0.0002	<0.0001	<0.0002	<0.3	NA
Acenaphthylene	mg/m^3	<0.0002	<0.0001	<0.0002	<0.3	NA
Anthracene	mg/m^3	<0.0002	<0.0001	<0.0002	<0.4	NA
Benzo (a) anthracene	mg/m^3	<0.0001	<0.00009	<0.0001	<0.4	NA
Benzo (a) pyrene	mg/m^3	<0.0002	<0.00009	<0.0002	<0.5	0.2
Benzo (b) fluoranthene	mg/m^3	<0.0001	<0.00009	<0.0001	<0.4	NA
Benzo (e) pyrene	mg/m^3	<0.0001	<0.00009	<0.0001	<0.4	NA
Benzo (g, h, i) perlene	mg/m^3	<0.0002	<0.0001	<0.0002	<0.5	NA
Benzo (k) fluoranthene	mg/m^3	<0.0001	<0.00009	<0.0001	<0.4	NA
Chrysene	mg/m^3	<0.0001	<0.00009	<0.0001	<0.4	0.2
Dibenzo (a, h) anthracene	mg/m^3	<0.0001	<0.00008	<0.0001	<0.4	NA
Fluoranthene	mg/m^3	<0.0002	<0.00009	<0.0002	<0.4	NA
Fluorene	mg/m^3	<0.0002	<0.0001	<0.0002	<0.3	NA
Indeno (1,2,3-cd) pyrene	mg/m^3	<0.0001	<0.00009	<0.0001	<0.5	NA
Naphthalene	ppm	0.055	0.0010	0.0032	<0.3	10
Phenanthrene	mg/m^3	<0.0002	<0.0001	<0.0002	<0.3	NA
Pyrene	mg/m^3	<0.0002	<0.00009	<0.0002	<0.4	NA

AIR SAMPLING RESULTS
SCCC/DIAMOND SITE
KEARNY, NEW JERSEY
March 30 & 31, 2011

Parameter	Units	Staff Scientist	Staff Engineer - 1	Staff Geologist - 1	Trailer	Field Blank (Total ug)	OSHA PEL
VOCs		**3/31/11**	**3/31/11**	**3/31/11**	**3/31/11**	**3/31/11**	
Methyl chloroform	ppm	<0.08	<0.09	<0.09	<0.08	<5	350
1,1,2-Trichloroethane	ppm	<0.09	<0.09	<0.09	<0.08	<5	10
1,1-Dichloroethane	ppm	<0.1	<0.1	<0.1	<0.1	<6	100
1,2-Dichloroethane	ppm	<0.1	<0.1	<0.1	<0.1	<5	50
Acetone	ppm	<0.2	<0.2	<0.2	<0.2	<6	1,000
Benzene	ppm	<0.06	<0.06	<0.06	<0.05	<2	1
Chlorobenzene	ppm	<0.1	<0.1	<0.1	<0.09	<5	75
Chloroform	ppm	<0.1	<0.1	<0.1	<0.09	<5	50 (C)
Cis-1,2-Dichloroethylene	ppm	<0.1	<0.1	<0.1	<0.1	<5	200
Cumene	ppm	<0.1	<0.1	<0.1	<0.09	<5	50
Cyclohexane	ppm	<0.1	<0.1	<0.1	<0.1	<5	200
Cyclohexanone	ppm	<0.1	<0.1	<0.1	<0.1	<5	50
Cyclohenene	ppm	<0.1	<0.1	<0.1	<0.1	<5	300
Ethyl Alcohol	ppm	0.85	1.1	0.3	3.6	<5	1,000
Ethylbenzene	ppm	<0.1	<0.1	<0.1	<0.09	<5	100
Isopropyl Alcohol	ppm	<0.2	<0.2	<0.2	0.2	<5	400
m-Dichlorobenzene	ppm	<0.08	<0.08	<0.08	<0.07	<5	NA
Methyl Ethyl Ketone	ppm	<0.2	<0.2	<0.2	<0.1	<5	200
Methyl Isobutyl Ketone	ppm	<0.1	<0.1	<0.1	<0.1	<5	100
Methyl n-Propyl Ketone	ppm	<0.1	<0.1	<0.1	<0.1	<5	200
Methylene Chloride	ppm	<0.1	<0.1	<0.1	<0.1	<5	25
n-Butyl Acetate	ppm	<0.1	<0.1	<0.1	<0.09	<5	150
n-Hexane	ppm	<0.1	<0.1	<0.1	<0.1	<5	500
n-Propyl Acetate	ppm	<0.1	<0.1	<0.1	<0.1	<5	200
o-Dichlorobenzene	ppm	<0.08	<0.08	<0.09	<0.07	<5	50 (C)
p-Dichlorobenzene	ppm	<0.08	<0.08	<0.09	<0.07	<5	75
Pentane	ppm	<0.2	<0.2	<0.2	<0.1	<5	1,000
Tetrachloroethylene	ppm	<0.07	<0.07	<0.07	<0.06	<5	100
Tetrahydrofuran	ppm	<0.2	<0.2	<0.2	<0.1	<5	200
Toluene	ppm	<0.1	<0.1	<0.1	<0.1	<5	200
Trichloroethylene	ppm	<0.09	<0.09	<0.09	<0.08	<5	100
Vinyl Chloride	ppm	<0.02	<0.02	<0.02	<0.02	<0.7	1
Xylene	ppm	<0.31	<0.32	<0.33	<0.28	<15	100

AIR SAMPLING RESULTS
SCCC/DIAMOND SITE
KEARNY, NEW JERSEY
April 7 & 8 2011

Parameter	Units	Staff Scientist Sample 1	Staff Scientist Sample 2	Field Blank (Total ug)	OSHA PEL
PAHs		**4/7/11**	**4/7/11**		
1-Nitropyrene	mg/m^3	<0.0003	<0.0003	<0.4	NA
Acenaphthene	mg/m^3	<0.0004	<0.0005	<0.3	NA
Acenaphthylene	mg/m^3	<0.0004	<0.0004	<0.3	NA
Anthracene	mg/m^3	<0.0004	<0.0004	<0.4	NA
Benzo (a) anthracene	mg/m^3	<0.0003	<0.0004	<0.4	NA
Benzo (a) pyrene	mg/m^3	<0.0003	<0.0004	<0.5	0.2
Benzo (b) fluoranthene	mg/m^3	<0.0003	<0.0004	<0.4	NA
Benzo (e) pyrene	mg/m^3	<0.0003	<0.0004	<0.4	NA
Benzo (g, h, i) perlene	mg/m^3	<0.0003	<0.0004	<0.5	NA
Benzo (k) fluoranthene	mg/m^3	<0.0003	<0.0004	<0.4	NA
Chrysene	mg/m^3	<0.0003	<0.0004	<0.4	0.2
Dibenzo (a, h) anthracene	mg/m^3	<0.0003	<0.0003	<0.4	NA
Fluoranthene	mg/m^3	<0.0003	<0.0004	<0.4	NA
Fluorene	mg/m^3	<0.0004	<0.0004	<0.3	NA
Indeno (1,2,3-cd) pyrene	mg/m^3	<0.0003	<0.0004	<0.5	NA
Naphthalene	ppm	0.001	0.031	<0.3	10
Phenanthrene	mg/m^3	<0.0004	<0.0004	<0.3	NA
Pyrene	mg/m^3	<0.0003	<0.0004	<0.4	NA

AIR SAMPLING RESULTS
SCCC/DIAMOND SITE
KEARNY, NEW JERSEY
April 7 & 8 2011

Parameter	Units	Staff Scientist	Staff Engineer - 2	Field Blank (Total ug)	OSHA PEL
VOCs		**4/7/11**	**4/8/11**		
Methyl chloroform	ppm	<0.1	<0.1	<5	350
1,1,2-Trichloroethane	ppm	<0.1	<0.1	<5	10
1,1-Dichloroethane	ppm	<0.2	<0.2	<6	100
1,2-Dichloroethane	ppm	<0.1	<0.2	<5	50
Acetone	ppm	<0.3	<0.3	<6	1,000
Benzene	ppm	<0.07	<0.08	<2	1
Chlorobenzene	ppm	<0.1	<0.1	<5	75
Chloroform	ppm	<0.1	<0.1	<5	50 (C)
Cis-1,2-Dichloroethylene	ppm	<0.1	<0.2	<5	200
Cumene	ppm	<0.1	<0.1	<5	50
Cyclohexane	ppm	<0.2	<0.2	<5	200
Cyclohexanone	ppm	<0.2	<0.2	<5	50
Cyclohenene	ppm	<0.2	<0.2	<5	300
Ethyl Alcohol	ppm	<0.4	<0.4	<5	1,000
Ethylbenzene	ppm	<0.1	<0.2	<5	100
Isopropyl Alcohol	ppm	<0.2	<0.3	<5	400
m-Dichlorobenzene	ppm	<0.1	<0.1	<5	NA
Methyl Ethyl Ketone	ppm	<0.2	<0.2	<5	200
Methyl Isobutyl Ketone	ppm	<0.1	<0.2	<5	100
Methyl n-Propyl Ketone	ppm	<0.2	<0.2	<5	200
Methylene Chloride	ppm	<0.2	<0.2	<5	25
n-Butyl Acetate	ppm	<0.1	<0.1	<5	150
n-Hexane	ppm	<0.2	<0.2	<5	500
n-Propyl Acetate	ppm	<0.1	<0.2	<5	200
o-Dichlorobenzene	ppm	<0.1	<0.1	<5	50 (C)
p-Dichlorobenzene	ppm	<0.1	<0.1	<5	75
Pentane	ppm	<0.2	<0.2	<5	1,000
Tetrachloroethylene	ppm	<0.09	<0.1	<5	100
Tetrahydrofuran	ppm	<0.2	<0.2	<5	200
Toluene	ppm	<0.2	<0.2	<5	200
Trichloroethylene	ppm	<0.1	<0.1	<5	100
Vinyl Chlroide	ppm	<0.03	<0.04	<0.7	1
Xylene	ppm	<0.39	<0.46	<15	100

AIR SAMPLING RESULTS
SCCC/DIAMOND SITE
KEARNY, NEW JERSEY
April 8 & 9, 2011

Parameter	Units	Staff Scientist	Staff Scientist	Field Blank (Total ug)	OSHA PEL	OSHA Action Level
		4/8/11	**4/9/11**			
Hexavalent Chromium	ug/m^3	<0.031	0.038	<0.029	5	2.5

AIR SAMPLING RESULTS
SCCC/DIAMOND SITE – KEY ENVIRONMENTAL, INC.
KEARNY, NEW JERSEY
APRIL 26 & 27, 2011

PARAMETER	Units	Staff Scientist	Staff Scientist	Staff Engineer - 2	Field Blank (Total ug)	OHSA PEL
VOCs		**4/26/11**	**4/27/11**	**4/27/11**		
Benzene	ppm	<0.05	<0.05	<0.05	<2	1
Chlorobenzene	ppm	<0.1	<0.1	<0.1	<5	75
Cumene	ppm	<0.1	<0.1	<0.1	<5	50
Ethylbenzene	ppm	<0.1	<0.1	<0.1	<5	100
m-Dichlorobenzene	ppm	<0.09	<0.09	<0.09	<5	NE
o-Dichlorobenzene	ppm	<0.1	<0.1	<0.1	<6	50 (C)
p-Dichlorobenzene	ppm	<0.1	<0.1	<0.1	<5	75
Toluene	ppm	<0.1	<0.1	<0.1	<5	200
Vinyl Toluene	ppm	<0.28	<0.27	<0.26	<11	100
Xylene	ppm	<0.41	<0.39	<0.38	<15	100

EMPLOYEE	DATE	NAPHTHALENE (ppm) OSHA PEL = 10
Staff Scientist - 1	4/26/11	<0.21
Staff Scientist - 2	4/26/11	<0.21
Staff Scientist - 3	4/26/11	<0.21
Staff Scientist - 4	4/26/11	<0.21
Staff Scientist - 5	4/26/11	<0.22
Staff Scientist - 6	4/26/11	<0.21
Staff Scientist – 1 – 27	4/27/11	<0.20
Staff Scientist – 2 – 27	4/27/11	<0.22
Staff Scientist – 3 – 27	4/27/11	<0.24
Staff Scientist – 4 – 27	4/27/11	<0.21
Staff Scientist – 5 – 27	4/27/11	<0.20
Staff Scientist – 6 – 27	4/27/11	<0.21
Staff Scientist – 7 – 27	4/27/11	<0.21
Staff Engineer (2) – 1 – 27	4/27/11	<0.20
Staff Engineer (2) – 2 – 27	4/27/11	<0.21
Staff Engineer (2) – 3 – 27	4/27/11	<0.23
Staff Engineer (2) – 4 – 27	4/27/11	<0.21
Staff Engineer (2) – 5 – 27	4/27/11	<0.20
Staff Engineer (2) – 6 – 27	4/27/11	<0.20
Staff Engineer (2) – 7 – 27	4/27/11	<0.21
Field Blank	4/26/11	<11 ug

APPENDIX C

COPC SCREENING FOR RESIDENTIAL LAND USE

TABLE C.1 - WESTERN AREA SURFACE SOILS (0-2 FEET)

Chemical	Concentration Used for Screening (2)	Toxicity Screening Value(4)			COPC Flag	Rationale for Selection or	COPC noncancer	COPC cancer
		Industrial	Residential	(N/C)	(Y/N)	Deletion (5)	Scr. Conc./Ind RSL	Scr. Conc./Ind RSL
1,2,3-Trichlorobenzene	210	49	4.9	N	Y	ASL	4.286	0
1,2,4-Trichlorobenzene	480	27	6.2	N	Y	ASL	17.778	0
1,2-Dichlorobenzene	220	980	190	N	Y	**BSL**	0.224	0
1,3-Dichlorobenzene*	200	980	190	N	Y	**BSL**	0.204	0
1,4-Dichlorobenzene	360	12	2.4	C	Y	ASL	0	30.000
Benzene	7.8	5.4	1.1	C	Y	ASL	0	1.444
Chlorobenzene	45	140	29	N	Y	**BSL**	0.321	0
Chloroform	0.00086	1.5	0.29	C	N	BSL	0	0
Methylene Chloride	0.93	310	36	N	N	BSL	0	0
1,1'-Biphenyl	14	21	5.1	N	Y	**BSL**	0.667	0
1,2,4,5-Tetrachlorobenzene*	4.2	27	1.8	N	Y	**BSL**	0.156	0
2,4-Dichlorophenol	0.34	180	18	N	N	BSL	0	0
2,4-Dimethylphenol	0.36	1200	120	N	N	BSL	0	0
2-Methylnaphthalene	0.54	220	23	N	N	BSL	0	0
2-Methylphenol	0.23	3100	310	N	N	BSL	0	0
4-Methylphenol	0.32	6200	610	N	N	BSL	0	0
Acenaphthene	1.1	3300	340	N	N	BSL	0	0
Acenaphthylene*	0.13	3300	340	N	N	BSL	0	0
Acetophenone	0.29	10000	780	N	N	BSL	0	0
Anthracene	1.1	17000	1700	N	N	BSL	0	0
Benzo(a)anthracene	1.5	2.1	0.15	C	Y	**BSL**	0	0.714
Benzo(a)pyrene	1.6	0.21	0.015	C	Y	ASL	0	7.619
Benzo(b)fluoranthene	2.2	2.1	0.15	C	Y	ASL	0	1.048
Benzo(g,h,i)perylene	1.7	-	-	-	N	BSL	0	0
Benzo(k)fluoranthene	2.2	21	1.5	C	Y	**BSL**	0	0.105
bis(2-Ethylhexyl)phthalate	120	120	35	C	Y	BSL	0	1.000
Carbazole*	0.36	-	-	-	N	BSL	0	0
Chrysene	6.4	210	15	C	N	BSL	0	0
Dibenz(a,h)anthracene	0.45	0.21	0.015	C	Y	ASL	0	2.143
Dibenzofuran	1.2	100	7.8	N	N	BSL	0	0
Diethylphthalate	0.06	49000	4900	N	N	BSL	0	0
Dimethylphthalate	0.62	-	-	-	N	BSL	0	0
Di-n-Butylphthalate	3.06	6200	610	N	N	BSL	0	0
Di-n-Octylphthalate	190	620	61	N	Y	**BSL**	0.306	0
Fluoranthene	3.14	2200	230	N	N	BSL	0	0
Fluorene	1.36	2200	230	N	N	BSL	0	0
Hexachlorobenzene	0.095	1.1	0.3	C	N	BSL	0	0
Hexachlorobutadiene	0.027	22	6.1	C	N	BSL	0	0
Indeno(1,2,3-cd)pyrene	1.9	2.1	0.15	C	Y	**BSL**	0	0.905
Naphthalene	3.22	18	3.6	C	N	BSL	0	0
N-Nitrosodiphenylamine	0.15	350	99	C	N	BSL	0	0
Phenanthrene*	6.8	17000	1700	N	N	BSL	0	0
Phenol	0.5	18000	1800	N	N	BSL	0	0
Pyrene	6.9	1700	170	N	N	BSL	0	0
PCB-1254	0.034	0.74	0.11	C	N	BSL	0	0
PCB-1260	4.2	0.74	0.22	C	Y	ASL	0	5.676
2,3,7,8-TCDD	0.00114525	0.000018	0.0000045	C	Y	ASL	0	63.625
Aluminum	29500	99000	7700	N	Y	**BSL**	0.298	0
Antimony	202	41	3.1	N	Y	ASL	4.927	0
Arsenic	17.7	2.4	0.61	C	Y	ASL	0	7.375
Barium	4210	19000	1500	N	Y	**BSL**	0.222	0
Beryllium	2.5	200	16	N	N	BSL	0	0
Cadmium	5.1	9300	7	N	N	BSL	0	0
Calcium	159000	-	-	-	N	BSL	0	0
Chromium	21400	150000	12000	N	Y	**BSL**	0.143	0
Cobalt	221	30	2.3	N	Y	ASL	7.367	0
Copper	278	4100	310	N	N	BSL	0	0
Iron	198000	72000	5500	N	Y	ASL	2.750	0
Lead	57300	800 (7)	400 (8)	N	Y	ASL	71.625	0
Magnesium	89700	-	-	-	N	BSL	0	0
Manganese	959	2300	180	N	Y	**BSL**	0.417	0
Mercury	0.36	4.3	1	N	N	BSL	0	0
Nickel	881	2000	150	N	Y	**BSL**	0.441	0
Potassium	1500	-	-	-	N	BSL	0	0
Selenium	1.8	510	39	N	N	BSL	0	0
Silver	1.3	510	39	N	N	BSL	0	0
Sodium	1440	-	-	-	N	BSL	0	0
Vanadium	1670	510	39	N	Y	ASL	3.275	0
Zinc	45300	31000	2300	N	Y	ASL	1.461	0
Chromium, hexavalent	3390	5.6	0.29	C	Y	ASL	0	605.357

sum	116.866	727.011
sum of **BSL**	3.177	1.724
ratio of **BSL**/total	0.027	0.002

TABLE C.2 - EASTERN AREA SURFACE SOILS (0 TO 2 FEET)

Chemical	Concentration Used for Screening [2]	Toxicity Screening Value [4]			COPC Flag (Y/N)	Rationale for Selection or Deletion [5]	COPC noncancer Scr. Conc./Ind RSL	COPC cancer Scr. Conc./Ind RSL
		Industrial	Residential	(N/C)				
1,2,4-Trichlorobenzene	200000	27	6.2	N	Y	ASL	7407.407	0
1,2-Dichloroethene	0.0765	920	70	N	N	BSL	0	0
1,2-Dichlorobenzene	6470	980	190	N	Y	ASL	6.602	0
1,3-Dichlorobenzene	1550	980	190	N	Y	ASL	1.582	0
1,4-Dichlorobenzene	4840	12	2.4	C	Y	ASL	0	403.333
Chlorobenzene	99.6	140	29	N	Y	**BSL**	0.711	0
Methylene Chloride	7.02	310	36	N	N	BSL	0	0
Tetrachloroethene	2.31	41	8.6	N	N	BSL	0	0
Trichloroethene	0.866	2	0.44	N	Y	**BSL**	0.433	0
1,1'-Biphenyl	0.4	21	5.1	N	N	BSL	0	0
2,4-Dimethylphenol	0.77	1200	120	N	N	BSL	0	0
4-Methylphenol	0.34	6200	610	N	N	BSL	0	0
Acenaphthene	219	3300	340	N	N	BSL	0	0
Acenaphthylene*	24.1	3300	340	N	N	BSL	0	0
Anthracene	46.2	17000	1700	N	N	BSL	0	0
Benzo(a)anthracene	22	2.1	0.15	C	Y	ASL	0	10.476
Benzo(a)pyrene	37	0.21	0.015	C	Y	ASL	0	176.190
Benzo(b)fluoranthene	65.8	2.1	0.15	C	Y	ASL	0	31.333
Benzo(g,h,i)perylene	34	--	--	--	N	BSL	0	0
bis(2-Ethylhexyl)phthalate	44.5	120	35	C	Y	**BSL**	0	0.371
Carbazole	1.6	--	--	--	N	BSL	0	0
Chrysene	41.9	210	15	C	Y	**BSL**	0	0.200
Dibenz(a,h)anthracene	8.8	0.21	0.015	C	Y	ASL	0	41.905
Dibenzofuran	1.2	100	7.8	N	N	BSL	0	0
Diethylphthalate	0.077	49000	4900	N	N	BSL	0	0
Fluoranthene	121	2200	230	N	N	BSL	0	0
Fluorene	213	2200	230	N	N	BSL	0	0
Hexachlorobenzene	359	1.1	0.3	C	Y	ASL	0	326.364
Hexachlorobutadiene	8.52	22	6.1	C	Y	**BSL**	0	0.387
Indeno(1,2,3-cd)pyrene	35.9	2.1	0.15	C	Y	ASL	0	17.095
Naphthalene	448	18	3.6	C	Y	ASL	0	24.889
Phenanthrene*	428	17000	1700	N	N	BSL	0	0
Pyrene	70.5	1700	170	N	N	BSL	0	0
PCB-1248	2.5	0.74	0.22	C	Y	ASL	0	3.378
PCB-1254	1	0.74	0.11	C	Y	ASL	0	1.351
PCB-1268*	0.46	0.74	0.22	C	Y	**BSL**	0	0.622
2,3,7,8-TCDD	0.0595	0.000018	0.0000045	C	Y	ASL	0	3305.556

sum	7416.736	4343.450
sum of **BSL**	1.144	1.579
ratio of **BSL**/total	0.000	0.000

TABLE C.3 - WESTERN AREA SUBSURFACE SOILS (0-10 FEET)

Chemical	Concentration Used for Screening [2]	Toxicity Screening Value [4] Industrial	Residential	(N/C)	COPC Flag (Y/N)	Rationale for Selection or Deletion [5]	COPC noncancer Scr. Conc./Ind RSL	COPC cancer Scr. Conc./Ind RSL
1,1,1-Trichloroethane	0.5	3800	870	N	N	BSL	0	0
1,2,3-Trichlorobenzene	210	49	4.9	N	Y	ASL	4.286	0
1,2,4-Trichlorobenzene	1300	27	6.2	N	Y	ASL	48.148	0
1,2-Dichlorobenzene	3300	980	190	N	Y	ASL	3.367	0
1,2-Dichloropropane	1.14	4.7	0.94	C	Y	BSL	0	0.243
1,3-Dichlorobenzene*	3300	980	190	N	Y	ASL	3.367	0
1,4-Dichlorobenzene	5200	12	2.4	C	Y	ASL	0	433.333
2-Butanone	0.56	20000	2800	N	N	BSL	0	0
Acetone	0.35	63000	6100	N	N	BSL	0	0
Benzene	110	5.4	1.1	C	Y	ASL	0	20.370
Carbon Disulfide	0.0059	370	82	N	N	BSL	0	0
Carbon Tetrachloride	0.089	3	0.61	C	N	BSL	0	0
Chlorobenzene	630	140	29	N	Y	ASL	4.500	0
Chloroform	0.00086	1.5	0.29	C	N	BSL	0	0
Chloromethane	0.18	50	12	N	N	BSL	0	0
cis-1,2-Dichloroethene	0.0021	200	16	N	N	BSL	0	0
Ethylbenzene	450	27	5.4	C	Y	ASL	0	16.667
m,p-Xylenes	1700	250	59	N	Y	ASL	6.800	0
Methylcyclohexane	48	--	--	--	N	BSL	0	0
Methylene Chloride	9.7	310	36	N	N	BSL	0	0
o-Xylene	600	300	69	N	Y	ASL	2.000	0
Styrene	4	3600	630	N	N	BSL	0	0
Tetrachloroethene	7.9	41	8.6	N	N	BSL	0	0
Toluene	420	4500	500	N	N	BSL	0	0
trans-1,2-Dichloroethene	0.00056	69	15	N	N	BSL	0	0
Vinyl Chloride	0.00096	1.7	0.06	C	N	BSL	0	0
Xylene (total)	110	270	63	N	Y	BSL	0.407	0
1,1'-Biphenyl	22	21	5.1	N	Y	ASL	1.048	0
1,2,4,5-Tetrachlorobenzene*	210	27	1.8	N	Y	ASL	7.778	0
2,4-Dichlorophenol	4.3	180	18	N	N	BSL	0	0
2,4-Dimethylphenol	0.36	1200	120	N	N	BSL	0	0
2-Methylnaphthalene	140	220	23	N	Y	BSL	0.636	0
2-Methylphenol	0.23	3100	310	N	N	BSL	0	0
4-Methylphenol	0.32	6200	610	N	N	BSL	0	0
Acenaphthene	25	3300	340	N	N	BSL	0	0
Acenaphthylene*	12	3300	340	N	N	BSL	0	0
Acetophenone	0.29	10000	780	N	N	BSL	0	0
Anthracene	90	17000	1700	N	N	BSL	0	0
Benzo(a)anthracene	87	2.1	0.15	C	Y	ASL	0	41.429
Benzo(a)pyrene	82	0.21	0.015	C	Y	ASL	0	390.476
Benzo(b)fluoranthene	58	2.1	0.15	C	Y	ASL	0	27.619
Benzo(g,h,i)perylene	53	--	--	--	N	BSL	0	0
Benzo(k)fluoranthene	11	21	1.5	C	Y	BSL	0	0.524
bis(2-Ethylhexyl)phthalate	120	120	35	C	Y	BSL	0	1.000
Carbazole	10	--	--	--	N	BSL	0	0
Chrysene	79	210	15	C	Y	BSL	0	0.376
Dibenz(a,h)anthracene	4.9	0.21	0.015	C	Y	ASL	0	23.333
Dibenzofuran	15	100	7.8	N	Y	BSL	0.150	0
Diethylphthalate	0.084	49000	4900	N	N	BSL	0	0
Dimethylphthalate	0.62	--	--	--	N	BSL	0	0
Di-n-Butylphthalate	3.06	6200	610	N	N	BSL	0	0
Di-n-Octylphthalate	190	620	61	N	Y	BSL	0.306	0
Fluoranthene	200	2200	230	N	N	BSL	0	0
Fluorene	65	2200	230	N	N	BSL	0	0
Hexachlorobenzene	0.095	1.1	0.3	C	N	BSL	0	0
Hexachlorobutadiene	0.027	22	6.1	C	N	BSL	0	0
Indeno(1,2,3-cd)pyrene	54	2.1	0.15	C	Y	ASL	0	25.714
Isophorone	0.36	1800	510	C	N	BSL	0	0
Naphthalene	110	18	3.6	C	Y	ASL	0	6.111
N-Nitrosodiphenylamine	0.15	350	99	C	N	BSL	0	0
Phenanthrene*	250	17000	1700	N	N	BSL	0	0
Phenol	0.5	18000	1800	N	N	BSL	0	0
Pyrene	190	1700	170	N	Y	BSL	0.112	0
PCB-1254	0.034	0.74	0.11	C	N	BSL	0	0
PCB-1260	4.2	0.74	0.22	C	Y	ASL	0	5.676
2,3,7,8-TCDD	0.004150167	0.000018	0.0000045	C	Y	ASL	0	230.565
Aluminum	29500	99000	7700	N	Y	BSL	0.298	0
Antimony	202	41	3.1	N	Y	ASL	4.927	0
Arsenic	54.9	2.4	0.61	C	Y	ASL	0	22.875
Barium	4210	19000	1500	N	Y	BSL	0.222	0
Beryllium	2.5	200	16	N	N	BSL	0	0
Cadmium	5.1	9300	7	N	N	BSL	0	0
Calcium	159000	--	--	--	N	BSL	0	0
Chromium	37000	150000	12000	N	Y	BSL	0.247	0
Cobalt	221	30	2.3	N	Y	ASL	7.367	0
Copper	335	4100	310	N	Y	BSL	0.082	0
Iron	198000	72000	5500	N	Y	ASL	2.750	0
Lead	57300	800 [7]	400 [8]	N	Y	ASL	71.625	0
Magnesium	89700	--	--	--	N	BSL	0	0
Manganese	959	2300	180	N	Y	BSL	0.417	0
Mercury	0.91	4.3	1	N	N	BSL	0	0
Nickel	881	2000	150	N	Y	BSL	0.441	0
Potassium	1500	--	--	--	N	BSL	0	0
Selenium	5.1	510	39	N	N	BSL	0	0
Silver	1.3	510	39	N	N	BSL	0	0
Sodium	1860	--	--	--	N	BSL	0	0
Thallium	5	1	0.078	N	Y	ASL	5.000	0
Vanadium	1670	510	39	N	Y	ASL	3.275	0
Zinc	45300	31000	2300	N	Y	ASL	1.461	0
Chromium, hexavalent	11000	5.6	0.29	C	Y	ASL	0	1964.286

sum	181.016	3210.597
sum of BSL	3.317	2.143
ratio of BSL/total	0.018	0.001

TABLE C.4 - EASTERN AREA SUBSURFACE SOILS (0 TO 10 FEET)

Chemical	Concentration Used for Screening [2]	Toxicity Screening Value [4] Industrial	Residential	(N/C)	COPC Flag (Y/N)	Rationale for Selection or Deletion [5]	COPC noncancer Scr. Conc./Ind RSL	COPC cancer Scr. Conc./Ind RSL
1,2,4-Trichlorobenzene	200000	27	6.2	N	Y	ASL	7407.407	0
1,2-Dichloroethene	0.0765	920	70	N	N	BSL	0	0
1,2-Dichlorobenzene	6470	980	190	N	Y	ASL	6.602	0
1,3-Dichlorobenzene*	1550	980	190	N	Y	ASL	1.582	0
1,4-Dichlorobenzene	4840	12	2.4	C	Y	ASL	0	403.333
Benzene	0.0035	5.4	1.1	C	N	BSL	0	0
Chlorobenzene	99.6	140	29	N	Y	**BSL**	0.711	0
Methylene Chloride	7.02	310	36	N	N	BSL	0	0
Tetrachloroethene	2.31	41	8.6	N	N	BSL	0	0
Trichloroethene	0.866	2	0.44	N	Y	**BSL**	0.433	0
1,1'-Biphenyl	4.6	21	5.1	N	N	BSL	0	0
2,4-Dimethylphenol	0.77	1200	120	N	N	BSL	0	0
2-Methylnaphthalene	35	220	23	N	Y	**BSL**	0.159	0
2-Methylphenol	0.031	3100	310	N	N	BSL	0	0
4-Methylphenol	8.8	6200	610	N	N	BSL	0	0
Acenaphthene	219	3300	340	N	N	BSL	0	0
Acenaphthylene*	24.1	3300	340	N	N	BSL	0	0
Anthracene	46.2	17000	1700	N	N	BSL	0	0
Benzo(a)anthracene	22	2.1	0.15	C	Y	ASL	0	10.476
Benzo(a)pyrene	37	0.21	0.015	C	Y	ASL	0	176.190
Benzo(b)fluoranthene	65.8	2.1	0.15	C	Y	ASL	0	31.333
Benzo(g,h,i)perylene	34	--	--	--	N	BSL	0	0
bis(2-Ethylhexyl)phthalate	44.5	120	34	C	Y	**BSL**	0	0.371
Carbazole	7	--	--	--	N	BSL	0	0
Chrysene	41.9	210	15	C	Y	**BSL**	0	0.200
Dibenz(a,h)anthracene	8.8	0.21	0.015	C	Y	ASL	0	41.905
Dibenzofuran	14	100	7.8	N	Y	**BSL**	0.140	0
Diethylphthalate	0.077	49000	4900	N	N	BSL	0	0
Fluoranthene	121	2200	230	N	N	BSL	0	0
Fluorene	213	2200	230	N	N	BSL	0	0
Hexachlorobenzene	359	1.1	0.3	C	Y	ASL	0	326.364
Hexachlorobutadiene	8.52	22	6.1	C	Y	**BSL**	0	0.387
Indeno(1,2,3-cd)pyrene	35.9	2.1	0.15	C	Y	ASL	0	17.095
Naphthalene	2000	18	3.6	C	Y	ASL	0	111.111
Phenanthrene	428	17000	1700	N	N	BSL	0	0
Pyrene	70.5	1700	170	N	N	BSL	0	0
PCB-1248	2.5	0.74	0.22	C	Y	ASL	0	3.378
PCB-1254	1	0.74	0.11	C	Y	ASL	0	1.351
PCB-1260	0.046	0.74	0.22	C	N	BSL	0	0
PCB-1268	0.46	0.74	0.22	C	Y	**BSL**	0	0.622
2,3,7,8-TCDD	0.0595	0.000018	0.0000045	C	Y	ASL	0	3305.556
Aluminum	27600	99000	7700	N	Y	**BSL**	0.279	0
Arsenic	9.8	2.4	0.61	C	Y	ASL	0	4.083
Barium	132	19000	1500	N	N	BSL	0	0
Beryllium	0.75	200	16	N	N	BSL	0	0
Cadmium	2.2	9300	7	N	N	BSL	0	0
Calcium	239000	--	--	--	N	BSL	0	0
Chromium	25200	150000	12000	N	Y	**BSL**	0.168	0
Cobalt	126	30	2.3	N	Y	ASL	4.200	0
Copper	23.8	4100	310	N	N	BSL	0	0
Iron	72100	72000	5500	N	Y	ASL	1.001	0
Lead	110	800 [7]	400 [8]	N	N	BSL	0	0
Magnesium	46800	--	--	--	N	BSL	0	0
Manganese	933	2300	180	N	Y	**BSL**	0.406	0
Mercury	1.3	4.3	1	N	Y	**BSL**	0.302	0
Nickel	597	2000	150	N	Y	**BSL**	0.299	0
Potassium	2210	--	--	--	N	BSL	0	0
Selenium	0.94	510	39	N	N	BSL	0	0
Silver	0.57	510	39	N	N	BSL	0	0
Sodium	2640	--	--	--	N	BSL	0	0
Thallium	9.4	1	0.078	N	Y	ASL	9.400	0
Vanadium	1390	510	39	N	Y	ASL	2.725	0
Zinc	223	31000	2300	N	Y	ASL	0	0
Chromium, hexavalent	3820	5.6	0.29	C	Y	ASL	0	682.143

sum	7435.815	5115.899
sum of **BSL**	2.897	1.579
ratio of **BSL**/total	0.000	0.000

TABLE C.5 - FORMER SEABOARD KOPPERS SITE SURFACE SOILS (0-2 FEET)

Chemical	Concentration Used for Screening [2]	Toxicity Screening Value [4]			COPC Flag (Y/N)	Rationale for Selection or Deletion [5]	COPC noncancer Scr. Conc./Ind RSL	COPC cancer Scr. Conc./Ind RSL
		Industrial	Residential	(N/C)				
1,1'-Biphenyl	0.056	21	5.1	N	N	BSL	0	0
2,4-Dimethylphenol	0.51	1200	120	N	N	BSL	0	0
2-Methylnaphthalene	0.17	220	310	N	N	BSL	0	0
2-Methylphenol	1.3	3100	3100	N	N	BSL	0	0
4-Chloroaniline	0.042	8.6	2.4	C	N	BSL	0	0
4-Methylphenol	1.7	6200	610	N	N	BSL	0	0
Acenaphthene	0.47	3300	340	N	N	BSL	0	0
Acenaphthylene*	0.47	3300	340	N	N	BSL	0	0
Acetophenone	0.026	10000	780	N	N	BSL	0	0
Anthracene	0.83	17000	1700	N	N	BSL	0	0
Benzaldehyde	0.68	10000	780	N	N	BSL	0	0
Benzo(a)anthracene	4.7	2.1	0.15	C	Y	ASL	0	2.238
Benzo(a)pyrene	7.5	0.21	0.015	C	Y	ASL	0	35.714
Benzo(b)fluoranthene	7.6	2.1	0.15	C	Y	ASL	0	3.619
Benzo(g,h,i)perylene	6.1	-	-	-	N	BSL	0	0
Benzo(k)fluoranthene	2.5	21	1.5	C	Y	**BSL**	0	0.119
bis(2-Ethylhexyl)phthalate	1	120	35	C	N	BSL	0	0
Butylbenzylphthalate	0.037	910	260	N	N	BSL	0	0
Carbazole	0.55	-	-	-	N	BSL	0	0
Chrysene	4.9	210	15	C	N	BSL	0	0
Dibenz(a,h)anthracene	1.5	0.21	0.015	C	Y	ASL	0	7.143
Dibenzofuran	0.24	100	7.8	N	N	BSL	0	0
Diethylphthalate	0.026	49000	4900	N	N	BSL	0	0
Di-n-Butylphthalate	0.055	6200	610	N	N	BSL	0	0
Di-n-Octyl phthalate	0.017	620	61	N	N	BSL	0	0
Fluoranthene	6.4	2200	230	N	N	BSL	0	0
Fluorene	0.38	2200	230	N	N	BSL	0	0
Indeno(1,2,3-cd)pyrene	4.9	2.1	0.15	C	Y	ASL	0	2.333
Naphthalene	0.67	18	3.6	C	N	BSL	0	0
Pentachlorophenol	0.81	2.7	0.89	C	N	BSL	0	0
Phenanthrene*	2.8	17000	1700	N	N	BSL	0	0
Phenol	8.6	18000	1800	N	N	BSL	0	0
Pyrene	5.3	1700	170	N	N	BSL	0	0
PCB-1242	0.28	0.74	0.22	C	Y	**BSL**	0	0.378
PCB-1254	0.3	0.74	0.11	C	Y	**BSL**	0	0.405
PCB-1260	0.2	0.74	0.22	C	N	BSL	0	0
2,3,7,8-TCDD	0.00014025	0.000018	0.0000045	C	Y	ASL	0	7.792
Chromium	5290	150000	12000	N	N	BSL	0	0
Chromium, hexavalent	121	5.6	0.29	C	Y	ASL	0	21.607

sum	0.000	81.349
sum of **BSL**	0.000	0.903
ratio of **BSL**/total	0.000	0.011

TABLE C.6 - FORMER KOPPERS SEABOARD SITE SUBSURFACE SOIL (0-10 FEET)

Chemical	Concentration Used for Screening [2]	Toxicity Screening Value [4]			COPC Flag	Rationale for Selection or	COPC noncancer	COPC cancer
		Industrial	Residential	(N/C)	(Y/N)	Deletion [5]	Scr. Conc./Ind RSL	Scr. Conc./Ind RSL
1,2,4-Trichlorobenzene	1300	27	6.2	N	Y	ASL	48.148	0
1,2-Dichlorobenzene	2700	980	190	N	Y	ASL	2.755	0
1,3-Dichlorobenzene*	2800	980	190	N	Y	ASL	2.857	0
1,4-Dichlorobenzene	1600	12	2.4	C	Y	ASL	0	133.333
Acetone	0.054	63000	6100	N	N	BSL	0	0
Carbon Disulfide	0.0023	370	82	N	N	BSL	0	0
Chlorobenzene	130	140	29	N	Y	BSL	0.929	0
Methylene Chloride	9.7	310	36	N	N	BSL	0	0
1,1'-Biphenyl	0.73	21	5.1	N	N	BSL	0	0
2,4-Dichlorophenol	0.59	180	18	N	N	BSL	0	0
2,4-Dimethylphenol	0.51	1200	120	N	N	BSL	0	0
2-Methylnaphthalene	0.63	220	23	N	N	BSL	0	0
2-Methylphenol	1.3	3100	310	N	N	BSL	0	0
4-Chloroaniline	0.042	8.6	2.4	C	N	BSL	0	0
4-Methylphenol	1.7	6200	610	N	N	BSL	0	0
Acenaphthene	1.1	3300	340	N	N	BSL	0	0
Acenaphthylene	0.84	3300	340	N	N	BSL	0	0
Acetophenone	0.026	10000	780	N	N	BSL	0	0
Anthracene	16	17000	1700	N	N	BSL	0	0
Benzaldehyde	0.68	10000	780	N	N	BSL	0	0
Benzo(a)anthracene	12	2.1	0.15	C	Y	ASL	0	5.714
Benzo(a)pyrene	15	0.21	0.015	C	Y	ASL	0	71.429
Benzo(b)fluoranthene	21	2.1	0.15	C	Y	ASL	0	10
Benzo(g,h,i)perylene	11	-	-	-	N	BSL	0	0
Benzo(k)fluoranthene	2.5	21	1.5	C	Y	BSL	0	0.119
bis(2-Ethylhexyl)phthalate	1	120	35	C	N	BSL	0	0
Butylbenzylphthalate	0.037	910	260	C	N	BSL	0	0
Carbazole	5.5	-	-	-	N	BSL	0	0
Chrysene	11	210	15	C	N	BSL	0	0
Dibenz(a,h)anthracene	2.6	0.21	0.015	C	Y	ASL	0	12.381
Dibenzofuran	1.1	100	7.8	N	N	BSL	0	0
Diethylphthalate	0.084	49000	4900	N	N	BSL	0	0
Di-n-Butylphthalate	0.055	6200	610	N	N	BSL	0	0
Di-n-Octylphthalate	0.017	620	61	N	N	BSL	0	0
Fluoranthene	23	2200	230	N	N	BSL	0	0
Fluorene	2.1	2200	230	N	N	BSL	0	0
Indeno(1,2,3-cd)pyrene	9.1	2.1	0.15	C	Y	ASL	0	4.333
Naphthalene	2	18	3.6	C	N	BSL	0	0
Pentachlorophenol	0.81	2.7	0.89	C	N	BSL	0	0
Phenanthrene*	12	17000	1700	N	N	BSL	0	0
Phenol	8.6	18000	1800	N	N	BSL	0	0
Pyrene	16	1700	170	N	N	BSL	0	0
PCB-1242	0.28	0.74	0.22	C	Y	BSL	0	0.378
PCB-1254	0.3	0.74	0.11	C	Y	BSL	0	0.405
PCB-1260	0.2	0.74	0.22	C	N	BSL	0	0
2,3,7,8-TCDD	0.00014025	0.000018	0.0000045	C	Y	ASL	0	7.792
Aluminum	13300	99000	7700	N	Y	BSL	0.134	0
Antimony	19.5	41	3.1	N	Y	BSL	0.476	0
Arsenic	54.9	2.4	0.61	C	Y	ASL	0	22.875
Barium	134	19000	1500	N	N	BSL	0	0
Beryllium	0.85	200	16	N	N	BSL	0	0
Cadmium	1.3	9300	7	N	N	BSL	0	0
Calcium	19900	-	-	-	N	BSL	0	0
Chromium	23200	150000	12000	N	N	BSL	0	0
Cobalt	16.9	30	2.3	N	Y	BSL	0.155	0
Copper	195	4100	310	N	N	BSL	0	0
Iron	37300	72000	5500	N	Y	BSL	0.518	0
Lead	3730	800 [7]	400 [8]	N	Y	ASL	4.663	0
Magnesium	6720	-	-	-	N	BSL	0	0
Manganese	526	2300	180	N	Y	BSL	0.229	0
Mercury	0.87	4.3	1	N	N	BSL	0	0
Nickel	65.4	2000	150	N	N	BSL	0	0
Potassium	2260	-	-	-	N	BSL	0	0
Selenium	3.7	510	39	N	N	BSL	0	0
Silver	0.65	510	39	N	N	BSL	0	0
Sodium	1540	-	-	-	N	BSL	0	0
Thallium	1.7	1	0.078	N	Y	ASL	1.700	0
Vanadium	127	510	39	N	Y	BSL	0.249	0
Zinc	449	31000	2300	N	N	BSL	0	0
Chromium, hexavalent	495	5.6	0.29	C	Y	ASL	0	88.393

sum	63.375	357.153
sum of **BSL**	3.252	0.903
ratio of BSL/total	0.051	0.003

APPENDIX D

CHEMICAL-SPECIFIC INPUT PARAMETERS

	Chemical/Physical Properties of COCs			Dermal Absorption of Chemicals in Water			
Chemical	Volatilization Factor[1] (m^3/kg)	Particulate Emission Factor [1] (m^3/kg)	Organic Carbon Partition Coefficient [1] (L/kg)	Dermal Perm. Coeff. [2] (cm/hr)	B Ratio[2] (unitless)	τ - Lag Time per Event [2] (hour)	t* - Time to Reach Steady State [2] (hours)
Benzene	3.80E+03	1.40E+09	145.8	1.50E-02	0.1	0.29	0.7
Chlorobenzene	6.90E+03	1.40E+09	233.9	2.80E-02	0.1	0.46	1.09
1,2,4,5-Tetrachlorobenzene	NA	1.40E+09	2220	NA	NA	NA	NA
1,2,3-Trichlorobenzene	3.50E+04	1.40E+09	1383	NA	NA	NA	NA
1,2,4-Trichlorobenzene	3.20E+04	1.40E+09	1356	6.60E-02	0.3	1.11	2.66
1,2-Dichlorobenzene	1.30E+04	1.40E+09	382.9	4.00E-02	0.2	0.71	1.71
1,3-Dichlorobenzene	NA	1.40E+09	638 [1]	5.80E-02	0.3	0.71	1.71
1,4-Dichlorobenzene	1.10E+04	1.40E+09	375.3	4.20E-02	0.2	0.71	1.71
Benzo(a)anthracene	NA	1.40E+09	176900	4.70E-01	2.8	2.03	8.53
Benzo(a)pyrene	NA	1.40E+09	587400	7.00E-01	4.3	2.69	11.67
Benzo(b)fluoranthene	NA	1.40E+09	599400	7.00E-01	4.3	2.77	12.03
Bis(2-ethylhexyl)phthalate	NA	1.40E+09	119600	NA	NA	NA	NA
Chrysene	NA	1.40E+09	180500	4.70E-01	2.8	2.03	8.53
Dibenz(a,h)anthracene	NA	1.40E+09	1912000	1.50E+00	9.7	3.88	17.57
Hexachlorobenzene	NA			1.30E-01	0.9	4.22	16.21
Indeno(1,2,3-cd)pyrene	NA	1.40E+09	3470000	1.00E+00	6.7	3.78	16.83
Naphthalene	5.00E+04	1.40E+09	1544	4.70E-02	0.2	0.56	1.34
Aluminum	NA	1.40E+09	NA	NA	NA	NA	NA
Antimony	NA	1.40E+09	NA	NA	NA	NA	NA
Arsenic	NA	1.40E+09	NA	NA	NA	NA	NA
Barium	NA	1.40E+09	NA	NA	NA	NA	NA
Cadmium	NA	1.40E+09	NA	NA	NA	NA	NA
Chromium (Total)	NA	1.40E+09	NA	NA	NA	NA	NA
Cobalt	NA	1.40E+09	NA	NA	NA	NA	NA
Copper	NA	1.40E+09	NA	NA	NA	NA	NA
Iron	NA	1.40E+09	NA	NA	NA	NA	NA
Lead	NA	1.40E+09	NA	NA	NA	NA	NA
Manganese	NA	1.40E+09	NA	NA	NA	NA	NA
Mercury	NA	1.40E+09	NA	NA	NA	NA	NA
Nickel	NA	1.40E+09	NA	NA	NA	NA	NA
Silver	NA	1.40E+09	NA	NA	NA	NA	NA
Thallium	NA	1.40E+09	NA	NA	NA	NA	NA
Vanadium	NA	1.40E+09	NA	NA	NA	NA	NA
Zinc	NA	1.40E+09	NA	NA	NA	NA	NA
Aroclor 1248	NA	1.40E+09	76530	NA	NA	NA	NA
Aroclor 1254	NA	1.40E+09	130500	NA	NA	NA	NA
Aroclor 1260	NA	1.40E+09	349700	NA	NA	NA	NA
Dioxins	NA	1.40E+09	249100	8.10E-01	5.6	6.82	30.09

(1) USEPA, November 2013 <http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/index.htm>
(2) USEPA, July 2004. Risk Assessment Guidance for Superfund - Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment). EPA/540/R-99/005